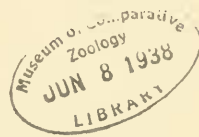


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NEW AND OBSCURE DECAPOD CRUSTACEA
FROM THE WEST AMERICAN COASTS

BY

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SAN DIEGO, CALIFORNIA

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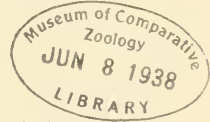
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INTRODUCTION

The material for this paper was collected from several sources, with localities ranging from La Jolla, California, to La Libertad, Ecuador. Twelve genera in five families are represented. Of these, three genera are proposed as new. Four genera are newly introduced to the west American fauna, three of these having been monotypic genera from west Atlantic waters, one, a monotype, from the Indo-Pacific region. Keys are given for three genera of west North American porcellanids, *Petrolisthes*, *Pachycheles* and the proposed genus *Pisonella*, split off from the genus *Pisosoma*. The holotypes for all the new species are deposited with the San Diego Society of Natural History.

For specimens I am indebted to Professor George E. MacGinitie of the California Institute of Technology, and Captain W. J. Seaholm and Mr. Woodbridge Williams, who brought in a splendid collection of well preserved material from southern waters, taken on a cruise of the yacht "Stranger," under the command of Captain Fred E. Lewis, of Balboa, California.

For the loan and gift of comparative material, photographs of obscure publications, literature and advice, I am under obligations to Dr. Waldo L. Schmitt, of the U. S. National Museum, Dr. Fenner A. Chace, Jr., of the Museum of Comparative Zoölogy, Mr. G. Robert Lunz, Jr., of the Charleston Museum, Dr. K. H. Barnard, of the South African Museum, and Mr. Melbourne Ward, of the Australian Museum.

To Mr. Anker Petersen, of Beverly Hills, California, who has given his own time and means to the drawing of the plates, I can but offer my thanks, with the full knowledge that his contribution is greater than my own.

CRANGONIDAE

Genus **Homoriscus** Rathbun**Homoriscus macginitiei**, sp. nov.

Plate 27, figures 1-4

Type.—Female, holotype, Cat. No. 1120, San Diego Society of Natural History; from La Jolla, California, low tide; March 4, 1935; collected by George E. MacGinitie.

Diagnosis.—Rostrum anteriorly subovate, armed. Antennal scale armed with 7 or 8 teeth. Chelipeds subchelate. Telson armed with 3 pairs of lateral spines. Outer margin of dactyl of 3rd ambulatory leg armed with 11 spines.

Description.—Carapace lightly pubescent, with 7 sharp longitudinal crests; the median occupies the posterior $\frac{4}{5}$ of carapace and is interrupted by the cervical groove; the submedian and supero-lateral crests begin near base of rostrum, the former posterior to this point. Both of these crests are less than half the length of the carapace, the supero-lateral being the shorter of the two. The infero-lateral crest begins at antennal sinus of anterior margin of carapace and is about half as long as submedian crest. Orbit semicircular, a little narrower than the black cornea beneath; outer orbital angle small and blunt-pointed. Rostrum semioval, armed anteriorly with fine, sharp teeth; upper surface lightly granulous, slightly concave. Third antennular peduncle extending its entire length past tip of rostrum. Antennular flagellum nearly $\frac{1}{2}$ the length of the median crest of the carapace. Antennular peduncles subequal in length to that of the antennular. Antennal acicle subovate, armed on its outer margin with a row of 7 or 8 fine, sharp teeth, inner margin setose. Flagellum nearly as long as the body.

Chelipeds subchelate, somewhat resembling those of the genus *Crangon*. Manus subquadrate, upper margin carinate, straight; lower margin with a median, fixed tooth, which acts as the pollex, the distal lower edge armed with 3 sharp, triangular teeth, the proximal the largest; the dactyl is arcuate, sharp-pointed, setose on its upper crest and unarmed on its inner edge. The 1st ambulatory leg in short and stout, in comparison with the others; the lower margin of the merus and the upper margin of the carpus, propodus and dactylus are setose; the dactyl is simple and heavier than the others; of the ambulatory legs the 2nd is the longest, followed by the 3rd, 4th and 1st. The dactyli of the 2nd, 3rd and 4th are slender, lanceolate, with their lengths as in the order given.

The outer maxillipeds have their ischium armed on the inner side with a row of spinules; the merus on the distal outer end with a spine; the propodus and dactylus subequal in length and longer than the carpus. Telson longer than broad, rounded at extremity; sides obscurely spinulous, with 3 pairs of lateral spines. Lateral lamina longer than telson; inner lamina longer than outer; outer margin of inner lamina smooth, of outer lamina spinulous.

Sexual variation and Color in life.—Unknown.

Measurements.—Female holotype: length from rostrum to tip of telson 18.3 mm., of carapace 7 mm., width of carapace 3.1 mm.

Material examined.—The two ovigerous type specimens.

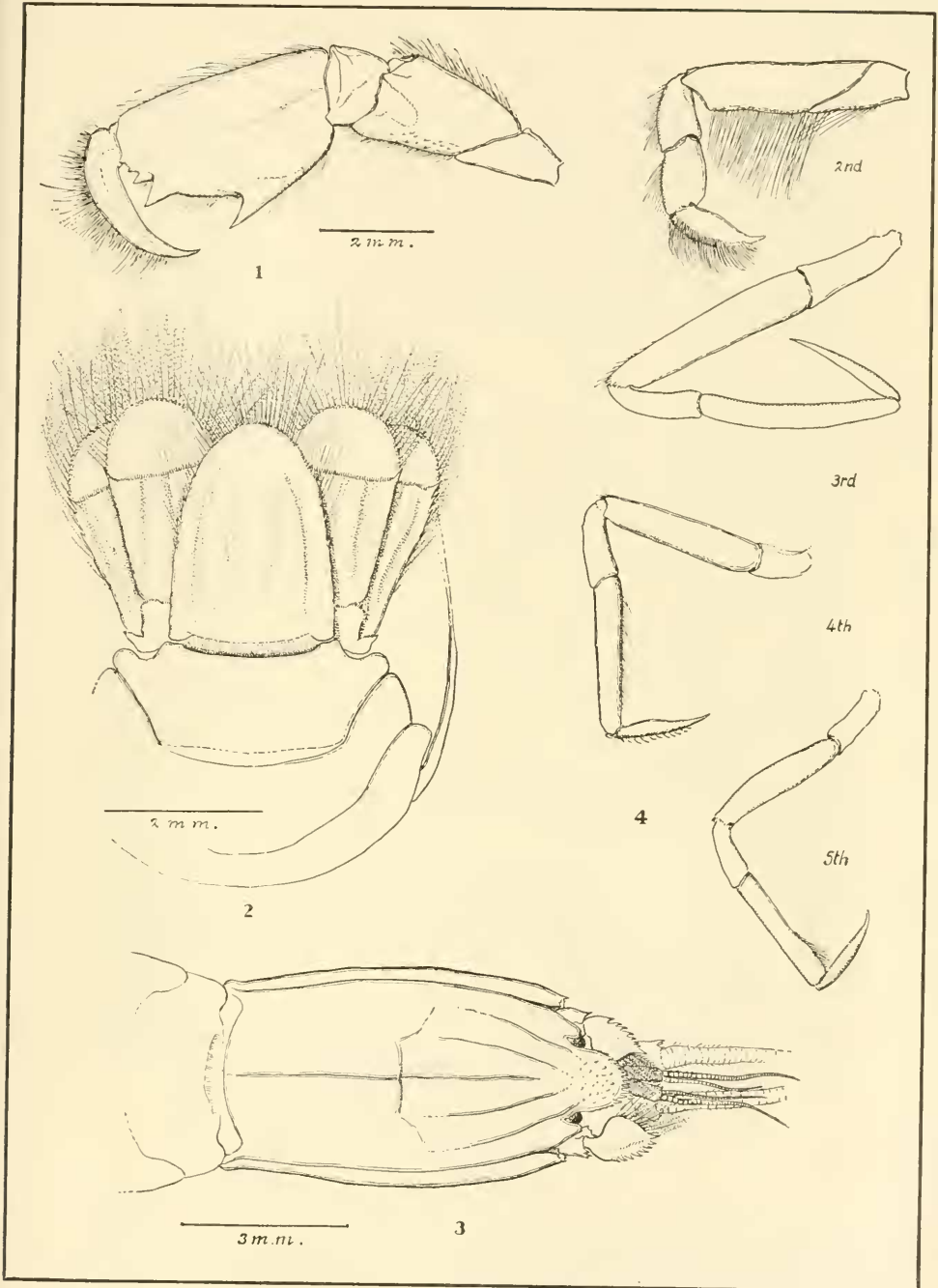


Fig. 1. *Homoriscus macginitiei* Glassell, sp. nov. Right cheliped.

Fig. 2. *Homoriscus macginitiei* Glassell, sp. nov. Telson.

Fig. 3. *Homoriscus macginitiei* Glassell, sp. nov. Carapace.

Fig. 4. *Homoriscus macginitiei* Glassell, sp. nov. Ambulatory legs.

Habitat.—Professor MacGinitie reports finding these two specimens in a small pool at extreme low water, after he had turned some stones in search of *Typhlogobius californiensis* Steindacher (the Blind Goby).

Remarks.—This proposed species is closely allied to *H. portoricensis* Rathbun, 1902. For the differences between these two species I cannot do better than quote a letter received from Dr. Fenner A. Chace, Jr., of the Museum of Comparative Zoölogy, at Harvard College, Cambridge, Massachusetts, who was kind enough to compare photographs of my drawings with a specimen of *H. portoricensis*, sent him from Havana, Cuba. Dr. Chace's findings are as follows:

"There is no doubt in my mind but that your form is specifically distinct from the Atlantic species. In comparing the two, the following differences are the most apparent: (1) Rostrum rounded rather than bluntly acute, (2) rostrum margined with a few distinct spines instead of being merely finely serrate, (3) rostrum reaching nearly to end of second antennular article rather than to middle of third segment, (4) submedian and supero-lateral crests of carapace entire instead of being minutely serrate, (5) antennal scale armed with 7 or 8 spines rather than 4 or 5, (6) the dactyl of the chelipeds is slightly shorter, the ratio of the length of the dactyl to the length of the palm being as 1 : 0.78 instead of as 1 : 0.73; consequently the apposable surface of the palm is longer, the large spine being placed more proximal, although the ratio of length to breadth of the palm is essentially the same in the two species—perhaps it is slightly broader in the Pacific species—and the armature is almost identically the same, (7) outer margin of palm of cheliped entire rather than armed with 3 or 4 small spines at distal fourth, (8) outer margin of dactyl of 3rd ambulatory leg armed with 11 spines rather than 2 or 3, (9) telson slightly longer and narrower at distal end; ratio of length to breadth as 1 : 0.60 instead of as 1 : 0.70, (10) telson armed with three pairs of lateral spines instead of a single pair at the junction of the smooth lateral margin with the setose terminal margin, and (11) outer margins of outer uropods much straighter; in *H. portoricensis* they are very convex. I might add that the inner margins of the dactyls of all the ambulatory legs in *H. portoricensis* are pectinate, irregularly so in the central portion. In the above comparisons, the characteristics of your species are given first in each case."

This proposed species is named for my good friend Professor George E. MacGinitie, of the California Institute of Technology, who collected this aberrant form and allowed me the privilege of describing it.

Genus *Betaeus* Dana

Betaeus ensenadensis, sp. nov.

Plate 28, figures 1-3

Type.—Male, holotype, Cat. No. 1121, San Diego Society of Natural History; from Estero de la Punta Banda, Ensenada, Baja California, Mexico, low tide; December 19, 1930; collected by George E. MacGinitie.

Diagnosis.—Front evenly rounded, not emarginate between the eyes. Hands similar, oblong, compressed; propodus subtruncate at apex; dactyl falcate

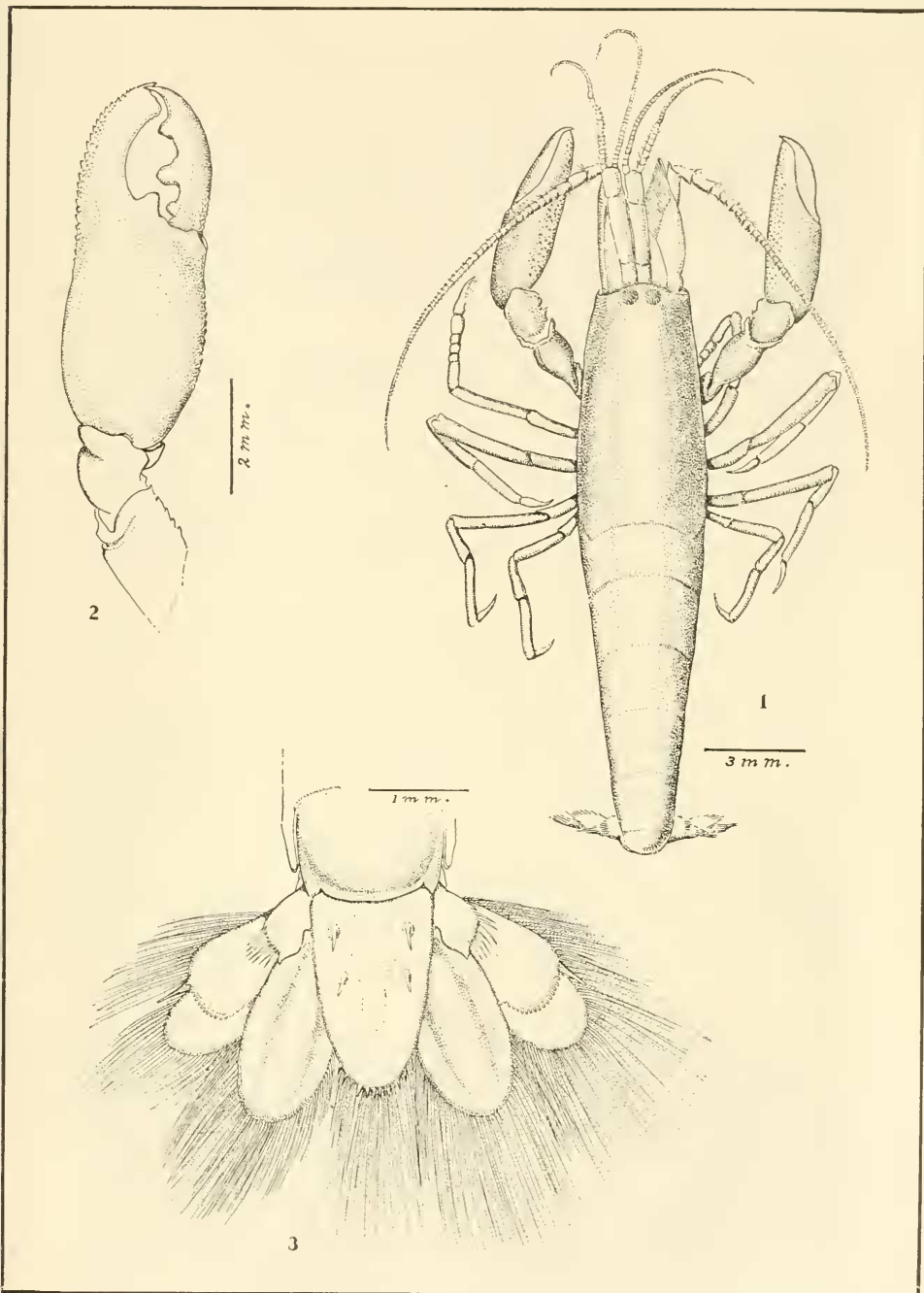


Fig. 1. *Betaeus ensenadensis* Glassell, sp. nov.

Fig. 2. *Betaeus ensenadensis* Glassell, sp. nov. Cheliped.

Fig. 3. *Betaeus ensenadensis* Glassell, sp. nov. Telson.

at tip, armed with three well-formed teeth.

Description.—Front evenly rounded, not emarginate. Carapace smooth, in life transparent, so that vital organs may be plainly seen, opaque in preservative. Second peduncle of antennule nearly twice the length of the third. Flagellum of antennae as long as chelipeds. Antennal acicle reaches past the proximal end of third peduncle of antennule, entire on outer margin, terminating in a spine; inner margin of acicle terminates near base of spine, evenly rounded at distal end, margin setose.

Chelipeds similar, $\frac{1}{3}$ longer than length of carapace; merus lightly dentate on inner margins, outer margin with a broad oblique sinus, transverse subdistal groove deep; carpus with a vertical, lamellar projection on inner face which fits into a recess of the merus, when arm is flexed; hand oblong, compressed, lightly granulated when viewed under a lens; the length of the palm is greater than the length of the dactyl; the dactyl is strongly falcate at the apex, is armed with three strong teeth, the median the largest, the proximal the smallest; the propodus is lightly granulated, proximally armed with a single, small tooth in the gape. The propodus terminates in a single, sharp, up-turned spine, at the base of which the propodus is truncate; the fingers are crossed at their tips, and gape from base to apex.

Color in life.—The carapace, abdomen and chelipeds are covered with light tinted chromatophores in reds and blues, the fingers and telson are tinted a light purple.

Measurements.—Male holotype (not the largest specimen, but the most perfect): length from rostrum to tip of telson 19.5 mm., of carapace 6.8 mm., of cheliped 10 mm., of manus 5.6 mm., of dactyl 3 mm. Female paratype: length from rostrum to tip of telson 21.2 mm., of carapace 6.5 mm. (the hands were missing).

Range.—So far only known from the type-locality.

Material examined.—A series of 12 specimens, from Estero de la Punta Banda, Ensenada, Baja California, Mexico; collected by George E. MacGinitie, December 19, 1930. The types were selected from this series.

A male specimen collected by the author at the same locality, December 25, 1936.

Habitat.—These specimens were found at low water in the burrows of *Callianassa* and *Upogebia*. Professor MacGinitie reports finding them in pairs.

Remarks.—This proposed species is allied to *B. longidactylus* Lockington, 1877, but differs from that species by the hands being more uniform in both the sexes, and in the individual showing little if any variation, instead of varying from long slim fingers with little gape, to those as figured by Schmitt in Univ. Calif. Publ. Zool., vol. 23, 1921, pl. 12, fig. 2, where the fingers are widely separated throughout their length. In addition, *B. ensenadensis* has the apex of its propodus subtruncate and spine-tipped, instead of being rather blunt-pointed as in *B. longidactylus*; it differs also by the dactyli being armed with 3 well-formed teeth, and being falcate distally where the fingers cross each other, instead of being unarmed, or having, at best, a small proximal tooth; the tips of the fingers crossed slightly. It also differs by the peduncles of the antennules

being of different length, the second nearly twice the length of the third, instead of being about equal length. In addition, *B. ensenadensis* is a much smaller species, a mature specimen of *B. longidactylus* measuring from rostrum to tip of telson 40.5 mm.

B. ensenadensis resembles the other known Californian representative of the genus, *B. harfordi* (Kingsley), 1878, in size, shape and relative lengths of the antennular peduncles (the 2nd being nearly twice the length of the 3rd), but differs in that the front is evenly rounded, instead of emarginate, by the hands being similar and suboblong, instead of dissimilar and oval, by the terminal spine of the antennal article extending far past the rounded inner margin, instead of extending a little past the rounded inner edge.

To Professor George E. MacGinitie of the California Institute of Technology, belongs the credit for collecting and recognizing this proposed species.

Note.—Since the above notes were written, an important extension of range for this species has been made by Professor MacGinitie, who collected two males and one ovigerous female, in *Upogebia* tubes, at False Bay, San Diego, California, on November 18, 1937. These specimens are in the author's collection.

PAGURIDAE

Paguristes sanguinimanus, sp. nov.

Type.—Male, holotype, and female, paratype, Cat. Nos. 1122 and 1123, San Diego Society of Natural History; from Punta Peñasco, Sonora, Mexico, low tide; May 2, 1935; collected by Steve A. Glassell.

Diagnosis.—Percervical portion of carapace longer than wide, areolate, laterally punctate, a gastric median groove; rostral tooth long, exceeding laterals. Chelipeds subsimilar, heavy, wide; inner margin of carpus not regularly, though distinctly, spined; hand with 4 spines on margin of palm. Flagellum reaching palm of hand, lightly ciliate. Eye-stalks long, cylindrical. Tip of antennal acicle extends but slightly past the median length of the eye-stalk, and is subequal in length to the distal end of the 3rd antennal peduncle. The flagellum of the antennule extends past the cornea.

Description.—Carapace with precervical portion longer than wide, punctate laterally and on the anterior portion of the gastric region, lightly setose laterally, smooth centrally, a median protogastric groove. The median tooth is long and slightly depressed, subtruncate at the tip, extending midway between the eye-scales, and is $1/6$ the length of the eye-stalk. The laterals extend $1/3$ the distance of the median, are obtuse, with a short terminal spine. The margin between the teeth is revolute and granulous.

Eye-stalks long, cylindrical, slightly outward turned, with tufts of setae on upper surface; in length they equal the length of the carpus. Ophthalmic scales triangular, sharp-pointed, margins entire.

Antennal acicle bifid at tip, a strong, proximal spine on upper surface at proximal $1/3$, two outer marginal, distal spines; in length it extends a little past the median portion of the eye-stalk. The 3rd antennal peduncle has 3 spines on

the upper proximal surface, in length it slightly exceeds the tip of the acicle. The flagellum reaches the palm of the hand and is longer than the precervical portion of the carapace, is lightly ciliated.

Chelipeds subsimilar, stout, wide, heavy, the upper surface covered with short, sharp-pointed tubercles, interspersed with short setae and some pubescence, the setae not much longer than the tubercle; merus with upper distal surface triangular, inner surface smooth, its lower margin spined, outer surface roughened with granules, lower distal margin spined; carpus about as wide as long, spines more prominent on and near inner margin, outer margin not distinct, surface covered with short, sharp-pointed tubercles; manus semioval, longer than wide, 4 conical, sharp-pointed spines on inner margin of palm, outer margin with small spines distally, entire surface set with sharp-pointed tubercles; fingers close set, tips corneous.

Ambulatory legs stout, rugose and setaceous, the first pair margined on the upper crest of the carpus, propodus and dactylus with spines, the second pair with a distal carpal spine only; the dactyli are slightly twisted.

The distal edge of the telson is armed with 4 well-spaced teeth on each segment; the right is the largest.

Color in alcohol.—The carapace, merus and carpus have a buff ground color with numerous circular red spots, the perimeter only being colored; the membranous covering of the branchials is reddish-purple. The hands are blood-red. The eye-stalks are orange-red, the base purple.

Measurements.—Male holotype (the largest specimen): length from rostrum to tip of telson 103 mm., of carapace 25 mm., of precervical portion of carapace 13 mm., width 11 mm., length of cheliped 38 mm., of merus 11 mm., of carpus 9 mm., width of carpus 8 mm., length of manus 13 mm., width of manus 10 mm., length of eye-stalk 9 mm.

Range.—Gulf of California.

Material examined.—A large series of 20 or more males, and 20 or more females, non-ovigerous, from Punta Peñasco, Sonora, Mexico, low tide; May 2, 1935; the types were selected from this series.

A series of 10 or more males, and 10 or more females, non-ovigerous, from the same location; April 12, 1937. Both series collected by the author.

Habitat.—This hermit crab, contrary to the majority of species in the genus, is apparently a littoral form, being very numerous at the type-locality, from mean low water down. The carcinoecia was a species of *Turritella*.

Remarks.—This proposed species is closely allied to *P. digueti*, Bouvier, 1892, which it resembles in many particulars, such as the shape of the front and the form of the chelipeds, particularly the hands. It differs from that species, however, by lacking distinct heavy spines on the inner carpal margin, instead of having 3 large conical spines, by the antennal acicle extending only a little past the middle of the eye-stalk, instead of $\frac{2}{3}$ the length of the eye-stalk, by the upper proximal surface of the 3rd antennal peduncle being armed with 3 spines, instead of with 2 spines, and by the ophthalmic scales being sharp-pointed, with

margins entire, instead of having a bifid tip.

In addition to these structural differences, there is one of anatomical distortion, for *P. sanguinimanus* occupies a shell with a circular aperture, the carapace remaining normal, while *P. digueti* favors a dwelling such as *Strombus*, which distorts the carapace, depressing the precervical portion and distending the branchial regions. This may be taken as a general statement.

While both species live in the same waters, *P. digueti* has been recorded at depths ranging from 10 to 40 fathoms, and *P. sanguinimanus* has so far only been taken as a shore form.

Paguristes anahuacus, sp. nov.

Type.—Male, holotype, and female, paratype, Cat. Nos. 1124 and 1125, San Diego Society of Natural History; from Punta Peñasco, Sonora, Mexico, low tide; May 2, 1935; collected by Steve A. Glassell.

Diagnosis.—Rostral tooth long, sharp-pointed, margined, concave on upper surface, extending well between the ocular scales for more than half their length. Eye-stalks extending past merus. Flagellum not reaching distal end of carpus, lightly ciliated. Chelipeds densely tomentose; carpus with 5 inner-marginal spines; palm of hand with 3; hand nearly twice as long as wide.

Description.—Precervical portion of carapace nearly $\frac{1}{3}$ longer than wide, tuberculate and tomentose laterally. Median tooth long, sharp, pointed, heavily margined, upper surface concave, the apex extending slightly past the center of the eye-scales; lateral teeth short, their outer margins convex, the inner concave. The margin between the laterals and the median is deep and revolute.

Eye-stalks long, nearly as long as the width of the carapace, heavy at the base, cylindrical distally, extending past the merus of the chelipeds and to the tip of the 3rd antennular peduncle. The ophthalmic scales are bifid, toothed on the outer margin, entire on the inner, and are tomentose distally.

The antennal acicle extends $\frac{2}{3}$ the length of the eye-stalk, and is armed on its proximal inner edge with a single, sharp-pointed tooth; the outer margin has 1 or 2 teeth at the distal $\frac{1}{3}$; the tip is bifid. The outer distal portion of the 2nd antennal peduncle extends $\frac{1}{3}$ the length of the acicle, is bifid and spined on the outer edge. The acicle is covered with long pinnate tomentum. The distal end of the 3rd antennal peduncle just reaches past the acicle. The flagellum extends past the middle of the carpus, is subequal in length to that of the hand, and is lightly ciliated.

The chelipeds are subequal; the upper crest of the merus and the upper surfaces of both the carpus and manus are densely tomentose, though not entirely covering the fingers; merus trigonal, distally spined, a transverse sub-distal groove extending down both sides, the outer surface rectangular, lightly rugose, the inner lower margin spined; carpus subequal in length to the merus, widest distally, the inner margin armed with 5 upward- and forward-pointing, corneous-tipped, conical spines, the outer margin with 8 or more smaller spines, the upper surface with numerous well-spaced tubercles; a prominent spine over

the upper hinge joint of the hand, the inner face smooth. The hands are nearly $1/2$ longer than wide, the inner margin of the palm with 3 spines, upper surface flat, covered with sharp-tipped tubercles, not quite in a distinct pattern; the outer distal margin of the pollex is spined, as is the upper proximal edge of the dactyl. The tips of the fingers are corneous, spooned. The hand is densely covered with tomentum except for the inner edges of the fingers.

The ambulatory legs are thickly margined with tomentum down to the corneous tips of the dactyli; the 1st pair extend past the chelipeds by the length of their dactyli; the carpi, propodi and dactyli of the 1st pair are crested with spines, the 2nd pair with a distal carpal spine only. The distal end of the telson is wider than its base, broadly V-shaped and armed with small teeth.

Color in alcohol.—Carapace reddish-brown with light blue spots. Chelipeds orange with cream-colored spots. Ground color of ambulatory legs orange overcast with blue, which gives the appearance of a dull lavender. The eye-stalks at their distended bases are light orange; the stalk is white with a submedian band of dusky violet-blue which distinguishes the species. The antennules are light blue. The antennal flagellum has its joints light blue on their proximal end and white distally. The tomentum is cream color.

Measurements.—Male holotype: length from rostrum to tip of telson 46.6 mm., of carapace 12.6 mm., of precervical portion 8.2 mm., width 5.5 mm., length of cheliped 22 mm., of merus 6 mm., of carpus 6 mm., of manus 7.5 mm., width 4 mm., length of eye-stalk 4 mm.

Range.—So far only known from the upper end of the Gulf of California.

Material examined.—A series of at least 100 specimens of both sexes, collected at Punta Peñasco, Sonora, Mexico, low tide; May 2, 1935; and a smaller series taken at the same locality, April 12, 1937; both series collected by the author.

Habitat.—Found from extreme low water to a depth of 10 fathoms. The carinoecia of the type specimens was a species of *Turritella*. They are abundant at the type-locality.

Remarks.—This proposed species is allied to *P. aztatlanensis* Glassell, 1937, in that the chelipeds are of similar shape, especially the hands, the flagellum being short and lightly ciliated; but it differs in that the median spine is long, extending well between the eye-scales, instead of being triangular and extending between the bases of the eye-scales, by the carpus of the chelipeds having 5 inner-marginal spines, the hand 3, instead of the carpus having 4 spines, the hand 3, and by the chelipeds being densely clothed with tomentum, instead of being lightly tufted. The front of the carapace in this proposed species somewhat resembles that of *P. spinipes* A. Milne Edwards, 1880.

This is another of the few species in this primitive genus of *Paguridae*, which may be termed littoral.

The name of this species is taken from a Nahuatl word signifying "within the water."

PORCELLANIDAE

Genus **Euceramus** Stimpson**Euceramus panatelus**, sp. nov.

Plate 29

Type.—Male, holotype, Cat. No. 1126, San Diego Society of Natural History; from La Libertad, Ecuador, 6-9 fathoms; March 24, 1937; collected by Woodbridge Williams, on Captain Fred E. Lewis' yacht "Stranger."

Diagnosis.—Carapace slightly longer than twice the width, nude, transverse, minute striations; frontal region tridentate, the median slightly longer than the laterals. Antennal flagellum $\frac{1}{3}$ longer than carapace, ciliated as in the genus *Lepidopa*. Chelipeds subequal in length to carapace, fingers gaping. Maxillipeds attached to a broadly truncate sternal segment.

Description.—Carapace slightly longer than twice the width, regularly curved like a segment of a cylinder, nude, cervical groove defined, minutely striated transversely, the lateral marginal carina only broken near posterior margin, precervical portion anteriorly granulate. Posterior margin widely V-shaped, edge revolute. Front horizontal, tridentate, teeth sharp, triangular, the median slightly the longest, separated from the laterals by a U-shaped sinus. Orbits incomplete, with concave superior margins, a microscopic spinule at its outer margin. A single lateral spine at the shoulder, behind the cervical groove. The eyes are retractile, stalks cylindrical, slightly contracted below cornea. When extended, the eyes extend past the frontal teeth and are equally as far advanced as the base of the flagellum; when retracted, they are not visible in a dorsal view. The antennules extend half their length past the eyes. The antennae are massive; the width of the first peduncle is nearly $\frac{1}{4}$ the width of the carapace, and equal to the length of the 2nd peduncle; the 3rd is short. The flagellum is nearly $\frac{1}{3}$ longer than the carapace, lined on its inner surface with two rows of inward directed cilia, so that when the antennae are brought together a hairy tube is formed, as in the antennae of the genus *Lepidopa*.

The chelipeds are subsimilar, unequal, slightly shorter than the length of the carapace; merus $\frac{1}{2}$ the width of the carapace and nearly as wide as long, unarmed, rugose; the carpus is equal in length to the merus, cylindrical, widest distally, unarmed, rugose on entire outer surface; the major hand is slightly more than twice as long as wide, slightly flattened on the outer surface of the palm, distended on the inner, with a wide rugose crest on the upper margin, the outer surface is transversely rugose, the rugae anteriorly bordered with short setae. The lower margin is proximally median between the articulations, formed of an obliquely longitudinal ridge of interrupted rugae which becomes beading on the lower margin of the pollex. From the inner side of the palm, and ending at the lower marginal crest, is a row of oblique rugae. The hand is widest at the base of the pollex. The pollex is nearly horizontal, slightly upturned at the tip and armed with a short distal cutting edge. The dactyl is falcate, with the upper margin armed with a few spinules and setae, on the under side with a median blunt tooth. The fingers gape widely from base to tips. The minor hand is simi-

lar to the major, except that it is not so stout, the fingers more slender and curved at their tips; in addition they are armed on their cutting edges with a row of small teeth. These fingers also gape from base to tips. The dactyli cross their respective pollices on opposite sides.

The ambulatory legs differ from each other, not alone in length, the 2nd and 3rd being longer than the 1st, but also in the relative shape of their carpi, propodi and dactyli: all three legs are margined with fine setae. The carpi and meri of the 2nd and 3rd legs are subequal in length to their meri, while the carpus is shorter than the merus in the 1st leg. The propodi of the 1st and 2nd legs are distorted, subequal in length to the dactyl in the 1st, shorter than the dactyl in the 2nd. The dactyli of the 1st and 2nd are slightly curved at the tip, rounded on their upper surfaces and slightly flattened beneath. In the 3rd leg, which is carried up over the back, the propodus is compressed, is as wide as long, and is shorter than the dactyl; the dactyl is sub-equal in length to its carpus, is vertically compressed, curved, and with a blunt tip. The lateral edges of all three pairs of dactyli are lined with setae. The fingers of the manus in the chelate last leg are half the length of the hand. The hand is 1 mm. in length.

The sternal piece, to which the maxillipeds are attached, is broadly truncate in front. The telson is composed of 7 plates.

Sexual variation.—In the female the hands are subequal, subsimilar and slighter than those in the male. The male abdomen is narrower than that of the female.

Color in alcohol.—Carapace cream, with front red and a transverse red median band. Fingers of chelipeds flecked with red.

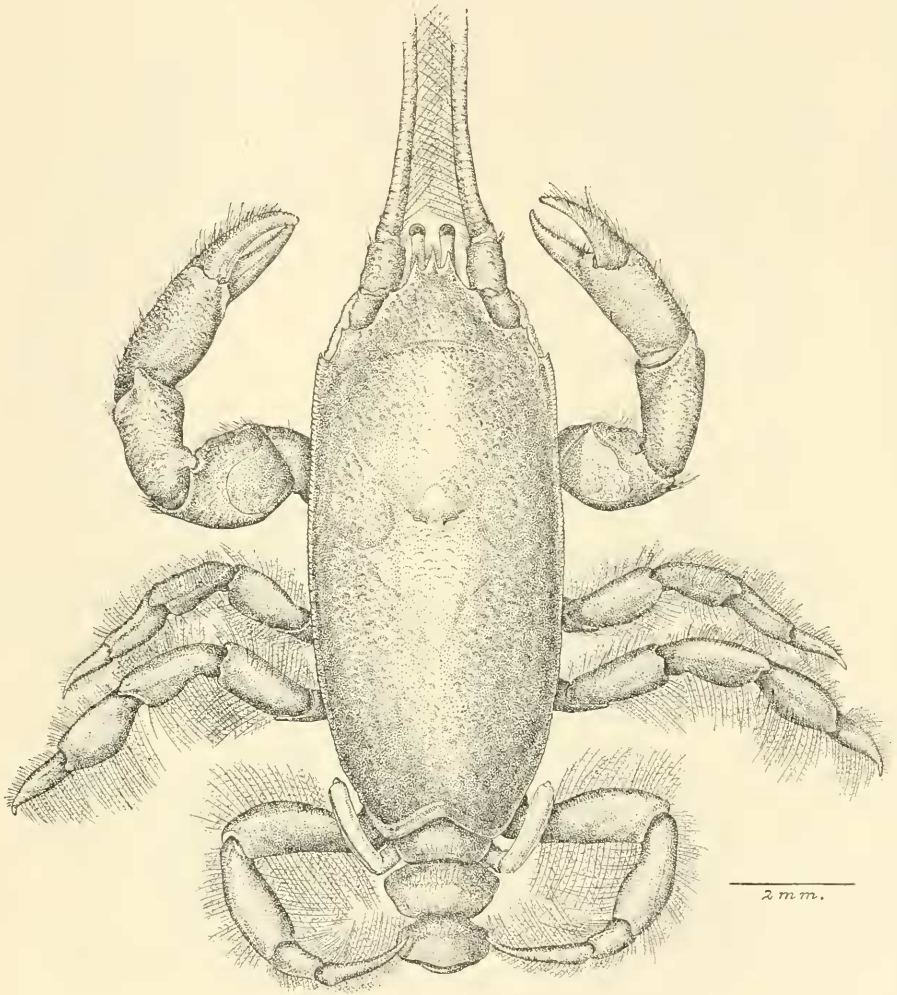
Measurements.—Male holotype: length of carapace 8.7 mm., width 4 mm., length of antennal flagellum 12.5 mm., length of major cheliped 7.5 mm., of merus 2 mm., of carpus 2 mm., of manus 3.5 mm., of dactyl 1.6 mm., width of hand 1.6 mm., length of 1st ambulatory propodus 1 mm., of dactyl 1 mm., length of 2nd ambulatory propodus 1.3 mm., of dactyl 1.5 mm., length of 3rd ambulatory propodus 0.9 mm., of dactyl 1.6 mm.

Range.—From Tenacatita Bay, Mexico, to La Libertad, Ecuador.

Material examined.—The following specimens were all collected by Woodbridge Williams, on Captain Fred E. Lewis' yacht "Stranger." 2 males and 2 females, La Libertad, Ecuador, in 6-9 fathoms, sand with mud bottom; March 24, 1937. One ovigerous female, San José, Guatemala, in 10 fathoms, sand bottom; April 1, 1937. One female, Isle Grande, Mexico, in 10-13 fathoms, sand bottom; April 8, 1937. One male and one female, Tenacatita Bay, Mexico, in 5 fathoms, fine grain sand with shell; April 11, 1937.

Habitat.—Found on a sand and mud, or sand and shell, bottom, in from 5 to 13 fathoms. Without doubt, to judge from the structure of the ambulatory legs and the disposition of the peculiarly ciliated antennae, this species is a burrowing form which remains concealed just under the surface of the sand.

Remarks.—This proposed species is closely allied to *E. praelongus* Stimpson, 1860, of the Atlantic coast, of which it is the Pacific analogue. It differs in that the dactyli of the ambulatory legs, with the exception of the first pair, which are equal to the length of their propodi, are longer than their propodi,



Euceramus panatelus Glassell, sp. nov. Male.

instead of "nearly as long as penult joint;" by the chelipeds being nearly as long as the carapace, instead of much shorter than the carapace; and by the maxillipeds being attached to a broadly truncate sternal plate, instead of a triangular sternal piece. In addition, the antennae in *E. panatelus* are much longer than those of the Atlantic species.

An examination of two specimens, a male and a female, of *E. praelongus*, furnished me by G. Robert Lunz, Jr., of the Charleston Museum, collected at Charleston, South Carolina, January 7, 1936, and a male specimen loaned me through the kindness of Dr. Waldo L. Schmitt, by the U. S. National Museum, collected by the U. S. Fish Commission Str. "Fish Hawk," off the west coast of Florida, in 3 fathoms, January 8, 1902, shows that in all three specimens the fingers of the chelipeds gape from base to apices, and are not as Stimpson described them "not gaping."

This proposed species, on account of its elongated shape and red median band, suggested a shape of cigar sold under the trade-name "Panatela."

Euceramus transversilineatus (Lockington), new combination

Plate 30

Porcellana transversilineata Lockington, Ann. Mag. Nat. Hist., ser. 5, vol. 2, 1878, p. 405 (type-locality, Boca de las Piedras, Sinaloa, Mexico; types not extant).

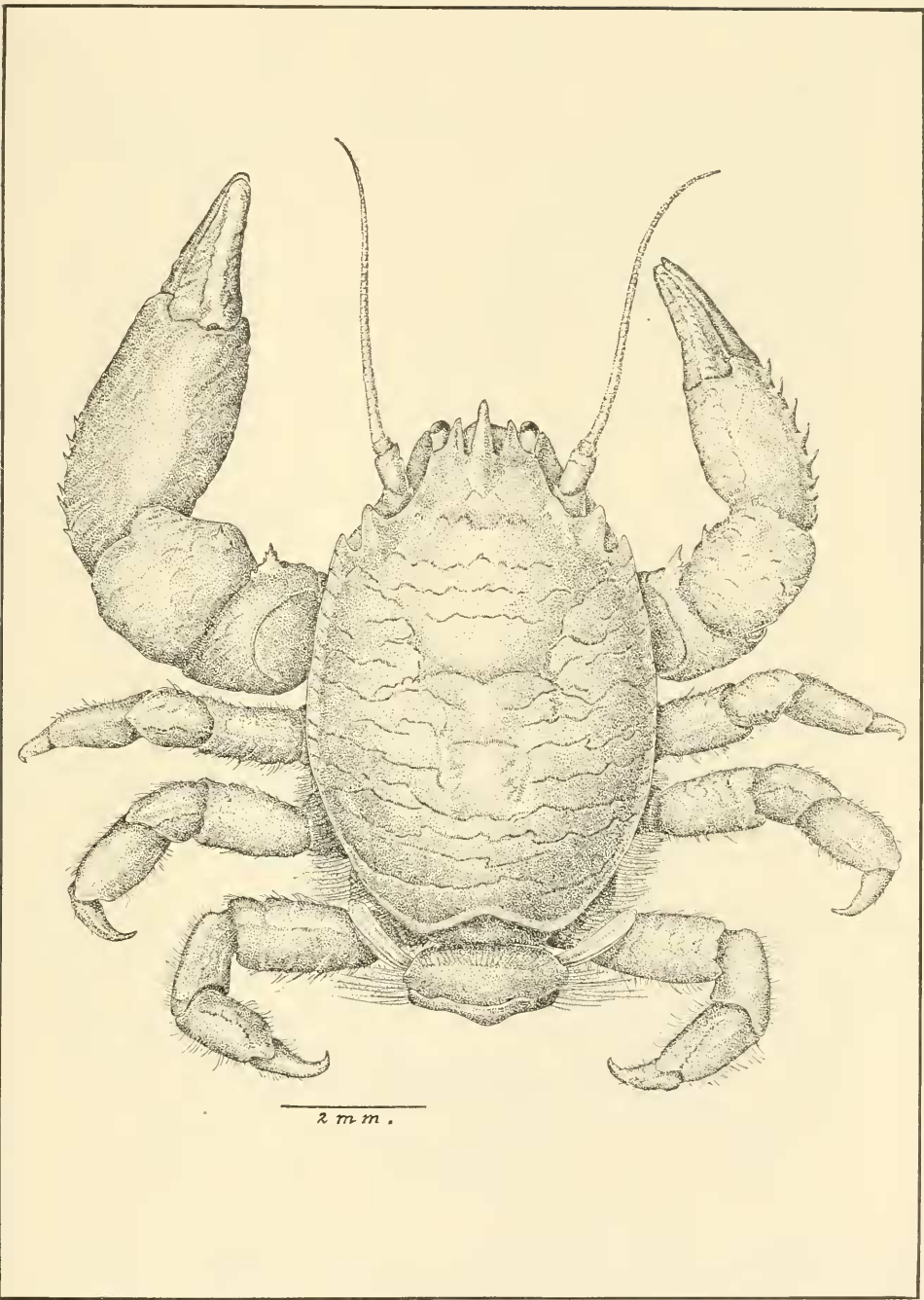
Lockington's type-locality falls well within the Gulf of California, if I am correct in assuming that Boca de las Piedras, Sinaloa (name not in the Coast Pilot), is the entrance to the Estero de las Piedras. The estero opens on the gulf 6 miles southward of the mouth of the Rio del Fuerte or Santa Maria de Ahome, and is in lat. $25^{\circ} 50'$ N. and long. $109^{\circ} 25'$ W. His second locality, Angeles Bay, Baja California, is in the upper part of the Gulf of California. This series, like all of Lockington's type material, was destroyed by fire in the San Francisco disaster of 1906.

On April 13, 1937, at Punta Peñasco, Sonora, Mexico, I took a small series of 3 specimens, at extreme low water, from the sand and shell material at the base of gorgonian corals. On May 8, 1937, at San Felipe, Baja California, Mexico, I secured another specimen under similar collecting conditions. In addition to the above, I took, on January 1, 1932, off the north end of Tiburón Island, Gulf of California, a female in 12 fathoms. From this material I am designating one female the neotype and one male the allotype.

Neotype.—Female; Cat. No. 1127, San Diego Society of Natural History; from off the north end of Tiburón Island, Gulf of California, Mexico; January 1, 1932, 12 fathoms; collected by Steve A. Glassell.

Allotype.—Male; Cat. No. 1128, San Diego Society of Natural History; from Punta Peñasco, Sonora, Mexico; April 13, 1937, low tide; collected by Steve A. Glassell.

Diagnosis.—Carapace $1/3$ longer than wide, transversely striate. Antennae subequal in length to width of carapace; basal peduncle short; flagellum naked.



Euceramus transversilineatus (Lockington). Male.

Chelipeds in females subequal, similar; in males unequal, dissimilar; merus with an inner distal spine; carpus with a submedian inner spine. Outer maxillipeds attached to strongly arched sternal segment. Dactyli of ambulatories subequal, stout, falcate. Telson of abdomen much larger in female, triangular, with 7 plates.

Description.—Carapace elongate, broadest posteriorly, about $1/3$ longer than wide, regions well-marked; surface transversely crossed by well-spaced, asymmetric, distinct striations which begin at the inner edge of the obliquely plicated, thin, lateral margins. Distally the lateral margins end in a sharp, forward-pointing spine, separated from the outer antennal-marginal tooth by a V-shaped notch. Posterior margin a concave obtuse angle. Protogastric ridge distinct, toothed, divided by a median sulcus. Front tridentate, the median slightly advanced beyond the laterals, which are on a slightly lower plane. The eyes are retractile, as in the genus. The antennae are short, the 2nd peduncle the longest; flagellum naked.

The chelipeds in the female are equal, subsimilar; in the male they are dissimilar and much stouter. The merus is distally armed on the inner margin with a sharp spine, rugose on upper and lower surfaces as is the carpus and manus; carpus on upper surface rectangular, flattened, with a single, submedian, inner marginal spine, and in addition there may be one or more spinules distally. The major hand in the male is stout, thick, with rugose upper carina and a spined lower margin; the fingers gape from base to blunted tips; the dactyl is crested with smooth granules, and is armed on the under edge with 3 or more large teeth; the proximal is double; the pollex is horizontal, armed with a row of low irregular lobes. The minor hand is narrow, with a median rugate ridge which divides the outer surface of the hand into two subconcave surfaces; the lower margin is spined, the fingers long, not gaping, the tips sharp. In the female the hands are like the minor hand in the male. In both sexes the outer surface is sparsely covered with clavate setae.

The ambulatory legs are stout, rugose and lightly covered with setae; the dactyli are subsimilar, long, stout, falcate, tips corneous.

The male abdomen is much smaller than that of the female, as is the telson. The outer maxillipeds are attached to a broadly arched first sternal segment.

Color in alcohol.—Deep cream with markings of orange-red.

Measurements.—Female neotype: length of carapace 8.3 mm., width 6.1 mm., length of hand 5 mm., width 1.5 mm., length of telson 4.1 mm., width at base 2.1 mm. Male allotype: length of carapace 6.2 mm., width 4.2 mm., length of major hand 5 mm., width 2.6 mm., thickness 1.6 mm., length of telson 1.9 mm., width at base 1 mm.

Range.—So far known only from the Gulf of California, Mexico.

Material examined.—The female neotype (see neotype). A series of 2 males and 1 female from Punta Peñasco, Sonora, Mexico, taken April 13, 1937, one of which is the allotype (see allotype). A single female from San Felipe, Baja California, Mexico, taken May 8, 1937. All collected by the author.

Habitat.—Found from extreme low water, partly covered with sand and shell fragments, to a depth of 12 fathoms.

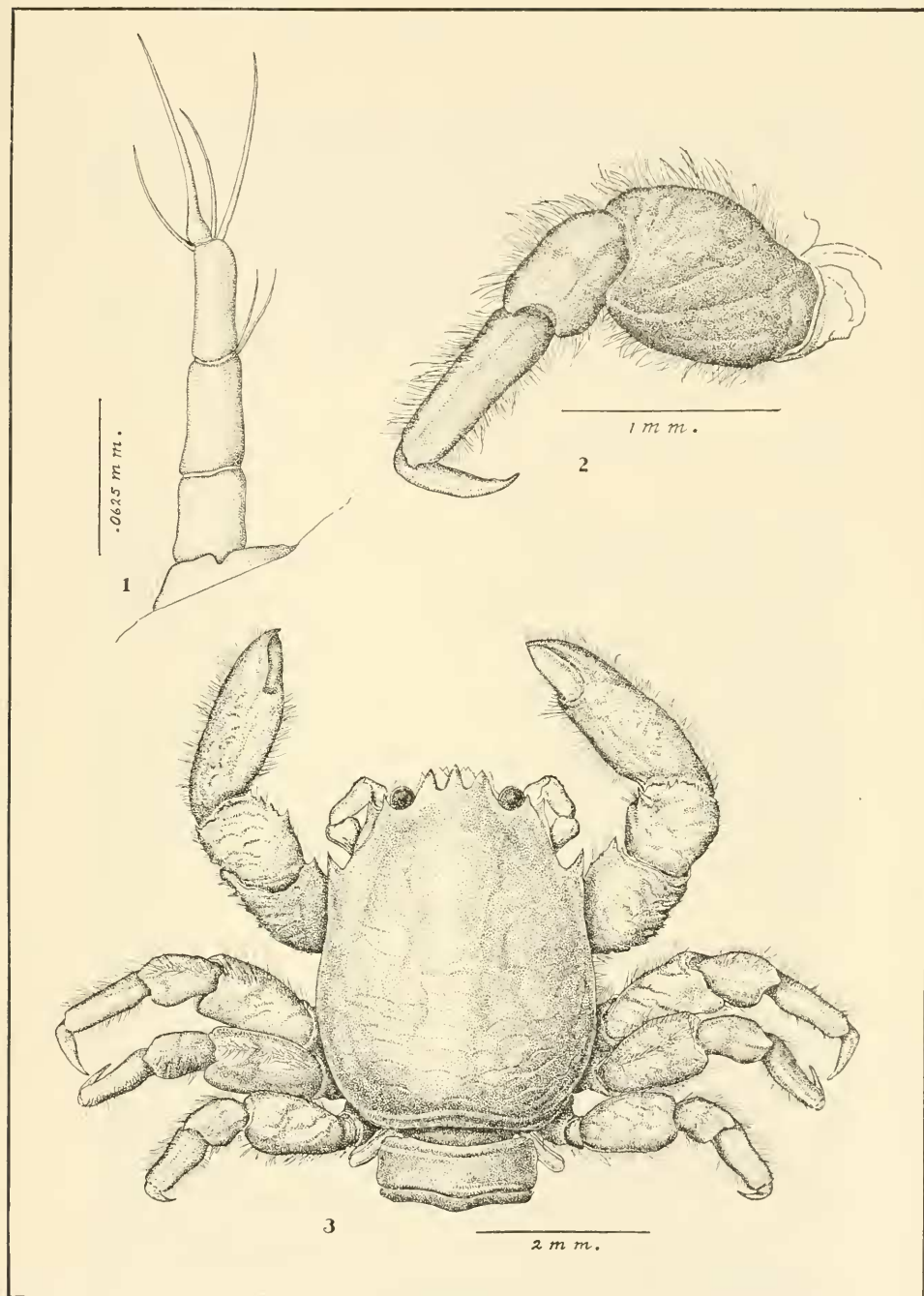


Fig. 1. *Minyocerus kirki* Glassell, sp. nov. Antennae.

Fig. 2. *Minyocerus kirki* Glassell, sp. nov. Left 3rd ambulatory leg.

Fig. 3. *Minyocerus kirki* Glassell, sp. nov. Male holotype.

Remarks.—This species of Lockington's is more closely allied to *E. praelongus* Stimpson, 1860, than it is to *E. panatelus* Glassell, although it differs in many respects from both of these species: (1) the carapace is shorter for its breadth, (2) the dactyli of the ambulatory legs are more nearly uniform and falcate, (3) the antennae are shorter and naked, (4) the major hand in the male is heavier in proportion to its length, (5) the striations on the carapace are more distinct, (6) the telson is longer in proportion to its width.

Lockington in his description of this species failed to mention the sex of his specimens, but it is evident that these were all females—"females with ova," for, had he also had adult males he would have noted the dimorphic character of the hands.

Genus *Minyocerus* Stimpson

Minyocerus kirki, sp. nov.

Plate 31, figures 1-3

Type.—Male, holotype, Cat. No. 1129, San Diego Society of Natural History; female, paratype, Cat. No. 1130, S. D. S. N. H.; from San Felipe, Baja, California, Mexico, low tide; May 11, 1937; collected by Steve A. Glassell.

Diagnosis.—Carapace convex in both directions, oblong. Chelipeds stout, rugose; carpus armed on inner margin. Ambulatory legs lightly ciliate; merus stout, rugose.

Description.—Carapace nearly $1/3$ longer than wide, suboblong, convex in both directions, highest longitudinally along median line, lightly rugose, more distinct posterior to the faintly outlined cervical groove. Front with three subequal teeth, the median slightly advanced, if any, past the laterals. A sharp forward- and upward-pointing spine at the shoulder, posterior to which the sides are subparallel. Posterior margin slightly concave. The antennules extend past the apices of the frontal spines. The antennae are extremely minute and difficult to locate without staining. They are placed posterior to the outer orbital spine, have 3 movable joints and a rudimentary flagellum; their total length is not equal to the width of the cornea of the eye. The eyes are retractile, on cylindrical white stalks, and in life the cornea is extended forward as far as the tips of the lateral spines.

Chelipeds stout in the male, more slender in the female, subsimilar, slightly unequal, more pronounced in the male; merus stout, rugose on upper surface, armed on inner distal margin with a sharp spine; carpus rugose and flattened on upper surface, armed on inner margin with a large median spine, followed distally by several spinules; the length of the major hand, in the male, including the fingers, is equal to the width of the carapace, and is nearly $1/3$ as wide as long; the hand in the female is shorter, but has the same length to width ratio; the outer margins are subparallel, the lower fringed with cilia; the fingers are close-fitting, their tips obtuse.

Ambulatory legs stout, margined with microscopic cilia; merus stout, nearly as wide as long, unarmed, rugose; the dactyli are lanceolate, sharp, curved at tip, nearly as long as their carpi. The telson has 7 segments.

Color in life.—Carapace with median longitudinal area white with a yellow cast, branchial areas brown with a greenish cast. Antennules blue, flagellum yellow. Palp of maxillipeds light green. Chelipeds and ambulatory legs with a whitish ground banded with brown. The carapace colors extend onto the first two abdominal segments. (Wm. A. Kirk, from field sketch).

Measurements.—Male holotype: length of carapace 3.5 mm., width 2.5 mm., length of hand including fingers 2.5 mm., width 1 mm. Female paratype: length of carapace 4 mm., width 2.8 mm., length of hand 2 mm., width 0.7 mm.

Range.—Known only from type-locality.

Material examined.—A series of 4 males and 4 gravid females, collected at San Felipe, Baja California, Mexico, May 11, 1937, by the author.

Habitat.—Found at extreme low water commensal on the sand starfish *Luidia columbia* (Gray). A pair of crabs was usually found on a single starfish, one on the dorsal, the other on the ventral side.

Remarks.—This proposed species is closely allied to *M. angustus* (Dana), 1852, but differs from that species in the following respects: the upper surface of the carpus of the chelipeds is nearly as wide as long, depressed and armed with a large inner marginal tooth, instead of being oblong, nearly entire, and by the meri of the ambulatory legs being stout, instead of slender.

Carlos Moriera, 1901, places Fritz Müller's *Porcellana stellicola*, in synonymy for *M. angustus* (Dana), and the same differences exist between my proposed species and that of Müller's, with the additional difference that in *M. kirki*, the antennae are composed of the usual three movable segments and a rudimental flagellum, instead of having six segments and a rudimentary flagellum, as figured in Ann. Mag. Nat. Hist., ser. 3, vol. 11, 1863, pl. 1, fig. 2.

This proposed species is named for my worthy friend Mr. William A. Kirk, of Los Angeles, California, who accompanied me to the Gulf of California, and made the discovery of this obscure little anomuran.

Porcellana magdalenensis Glassell

Plate 32, figures 1, 2

Porcellana magdalenensis Glassell. Trans. San Diego Soc. Nat. Hist., vol. 8, no. 21, 1936, p. 295.

At the time this species was described, the only specimens at hand were a series of five females, two of which were juvenile. Since then, a series of five males and one dismembered, ovigerous female, was collected in Acapulco Bay, State of Guerrero, Mexico, by Mr. Woodbridge Williams, on Captain Fred E. Lewis' yacht "Stranger," April 6, 1937. The adult males in this series differed in so many respects from the already described females, that they were at first considered to be a separate species. However, a close study of the juvenile and adolescent specimens proved their dimorphic character.

Description of male.—Carapace nearly smooth, except for light pubescence anteriorly, cervical groove well defined. Front broad, slightly less than half the length of the carapace, tridentate, the median twice the size of the laterals.

triangular, with a median longitudinal sulcus, microscopically margined with spinules, depressed and obtuse at the tip. The laterals are half the length of the median tooth, from which they are separated by a V-shaped sinus. Their outer spinous margins form the upper ocular margins. The lateral margin of the carapace is bordered with a row of sharp, upward- and forward-pointing spines, and is continued onto the carapace, behind the cervical groove, forming an unarmed though slightly granulose shoulder. The posterior margin is nearly straight. The antennal flagellum exceeds the length of the chelipeds.

The chelipeds are long, unequal, dissimilar; merus nearly smooth, unarmed on carpal articulation, with a wide, anteriorly produced, compressed, inner, distal lobe, well dentated on the margin in adolescents and females, nearly obsolete in adult males, carpus microscopically rugose on the slightly rounded upper surface, $1/3$ longer than wide, and the upper, inner margin may or may not be armed with two small spines in the adults. The major manus is naked, stout, unarmed on margins or surfaces; the upper margin of the palm has a slight carina; a blunt longitudinal median ridge extends from the proximal end to a point near the gape; from this ridge to the outer, slightly beaded or simply rounded margin, the surface is slightly concave, as is the outer surface of the pollex. The pollex is short, blunt, stout, and armed with a single low lobe. The dactyl is smooth, slightly curved, stout and armed with a median lobe. The fingers gape from their bases to their blunt apices. There is a trace of pubescence in the gape. The minor cheliped has the two inner marginal spines of the carpus more distinct, the entire margin roughened with smaller spines; in adolescents and females the outer carpal margin has a row of upturned spines which are lacking in adult males; the manus is narrow, contorted, armed on its outer margin with a row of spines, partly concealed in pubescence, inner margin smooth; a median ridge, armed distally with sharp spines, divides the outer surface of the palm into concave surfaces, the outer pubescent. The arched, sharp-pointed dactyl is longer than the palm, crested with a row of spinules, and, on the scooped-out under surface, is setose and pubescent. The pollex is distorted, sharp-tipped, slender, and, like the dactyl, is setose and pubescent on its cutting edge.

Ambulatory legs long, as in the female; dactyl of the first pair extending past the distal end of the carpus of the chelipeds. The telson is composed of 7 plates.

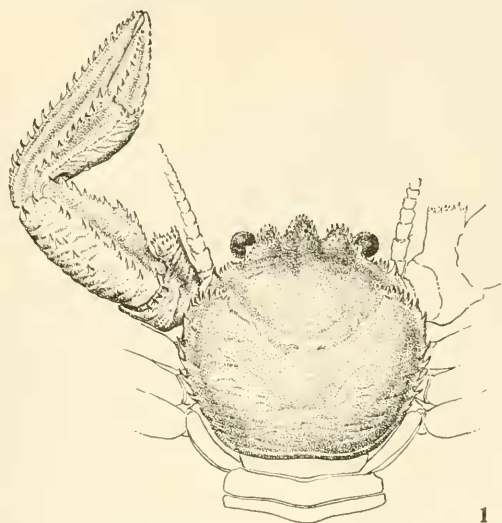
Color in alcohol.—Carapace cream. Chelipeds orange-red. Ambulatory legs cream, banded with red or orange.

Measurements.—Adult male: length of carapace 3.6 mm., width 3.8 mm., length of carpus 3 mm., width 2 mm., length of major manus 5.5 mm., width 2.2 mm., length of minor manus 4.5 mm., width 1.3 mm.

Range.—From Magdalena Bay, Baja California, Mexico, to Panama.

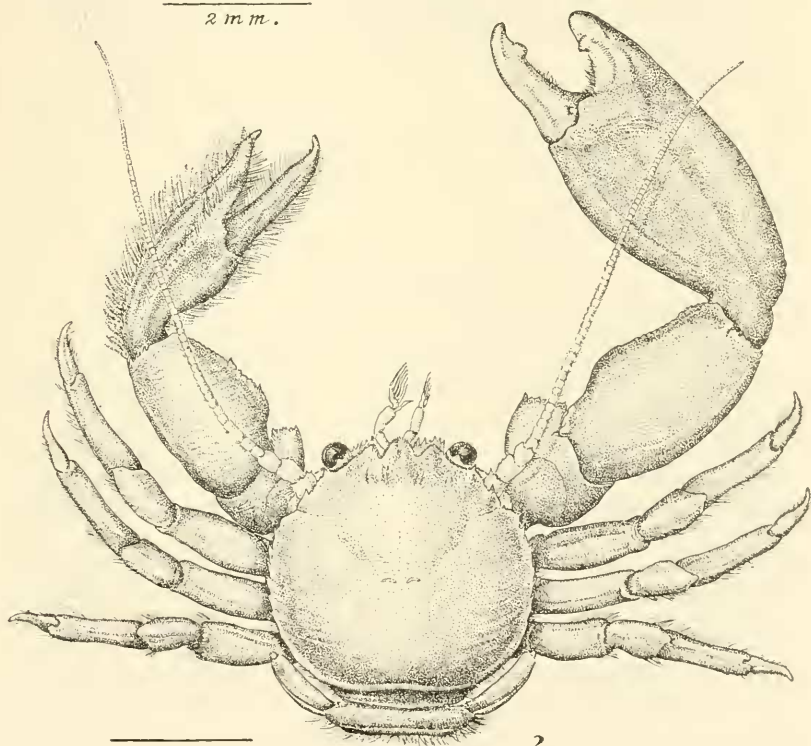
Material examined.—In addition to the type-series from Magdalena Bay, I examined an adolescent male, from Perico Island, Panama, collected by the U. S. Fish Commission, S. S. "Albatross," October 26, 1904. This specimen was sent me for identification by Dr. Waldo L. Schmitt of the U. S. National Museum, and has been returned to that institution.

Remarks.—The juveniles of both sexes are quite similar to the adult female form.



1

2 m. m.



2

2 m. m.

Fig. 1. *Porcellana magdalenensis* Glassell. Female.
Fig. 2. *Porcellana magdalenensis* Glassell. Male.

Ulloaia, gen. nov.

Carapace oblong-ovate, slightly longer than broad, convex, regions defined, surface squamo-tuberculate, lateral margins carinate, toothed. Front in dorsal view with a deep, wide, V-shaped, median notch, on each side of which are 2 short, multi-spined spinules, separated from each other by a notch. The median or rostral process in frontal view is subvertical, truncate and serrate on the lower edge. Eyes small, not retractile. First antennal peduncle removed from the eye, not joining the margin of the carapace; flagellum short, slightly more than $1/2$ the width of the carapace. Chelipeds short; carpus cylindrical, slightly longer than wide; hands compressed, weak. Ambulatory legs short, compressed, bent; dactyli simple, not multiunguiculate.

This proposed genus is rather distantly related to *Minyocerus*, Stimpson, 1858, in which the carapace is concave, the ambulatory legs short, the dactyli not multiunguiculate. In the shape of the carapace and its peculiar front, this genus differs from all the other genera in the family; in fact, in the general appearance of the carapace, it somewhat resembles species of the genus *Mithrax*, Latreille, 1817, of the family Majidae.

Genotype.—*Ulloaia perpusillia*, new species, taken at Punta Peñasco (Rocky Point), Sonora, Mexico, low tide, April 12, 1937, by Steve A. Glassell.

Remarks.—This proposed genus is named for Francisco de Ulloa, conquistador, explorer and navigator, who was the first to prove that Baja California was not an island, by directing his ship into the treacherous upper reaches of the Gulf of California, after which he traversed the eastern coast of the peninsula, doubled Cabo San Lucas, at the lower end, and sailed westward into the setting sun.

Ulloaia perpusillia, sp. nov.

Plate 33, figure 1

Type.—Male, holotype, Cat. No. 1131, San Diego Society of Natural History; from Punta Peñasco, Sonora, Mexico, low tide; April 12, 1937; collected by Steve A. Glassell.

Diagnosis.—Carapace oblong-ovate, longer than broad, convex, with a raised, longitudinal, median groove dividing the carapace into two halves. Gastric and cardiac regions raised. Posterior margin convex, entire. Branchial region with raised, flat-top tubercles. Telson with 7 plates.

Description.—Carapace oblong-ovate, longer than broad, convex, regions well defined; a longitudinal groove over the gastric and cardiac regions extending from the front to the posterior border divides the carapace into halves. The gastric and cardiac regions are raised, separated from each other by a well defined sulci; the median groove on the gastric region is bordered by longitudinal rugose ridges, on the cardiac region by rounded excrescences. The branchial regions have numerous wart-like, truncate-tipped, excrescences arising from the punctate surface, these granulose ridges and warts being more prominent on the posterior half of the carapace. The intestinal region is free from tubercles except

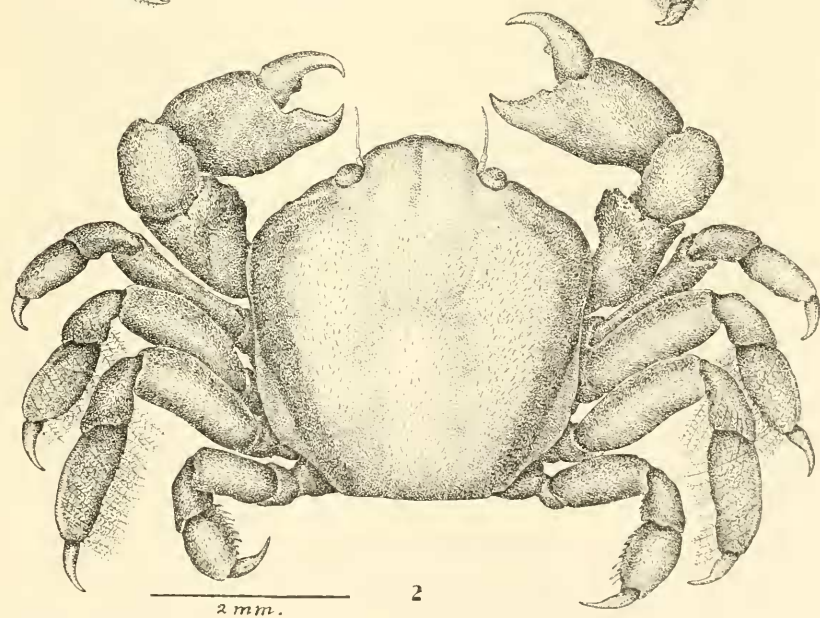
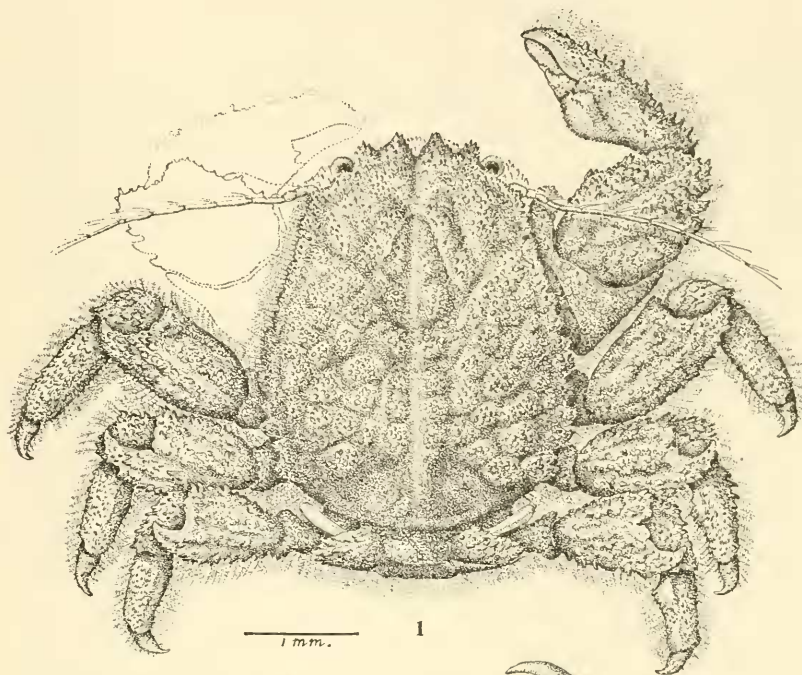


Fig. 1. *Ulloaia perpusillia* Glassell, sp. nov. Male holotype.
Fig. 2. *Fabia granti* Glassell. Male.

for small granules bordering the median groove. The front in a dorsal view has a deep, granulous, median notch, on each side of which are two forward- and upward-pointing spinules, separated from each other by a small V-shaped notch. In a frontal view the rostral process is subvertical, truncate and serrate at the tip, a sort of apron between the antennules. There is a tubercle on the upper ocular margin. The lateral margin is a carinate row of granulose lobes, diminishing in size anteriorly. The antennae are short; the joints of the flagellum rather long, with sparse cilia.

Chelipeds stout, short (only one chela remaining on the two specimens); merus short, stout, armed with an inner distal, lamellar lobe, width extremely narrow on the anterior carpal articulation, triangular and wide on the upper posterior face; carpus slightly longer than wide, inner margin with a median, serrate lobe; upper surface very rough, with an uneven median ridge bordered by sulci, a twisted row of tumid excrescences anterior to the median ridge, a row of unequal serrate lobes on the outer margin. The lower surface of the merus and carpus are on one plane, and flat. The hand is weak, compressed, shorter than the combined length of the lower surface of the carpus and merus, flexed, the arch of travel in the carpal articulation being small. The under surface of the hand is tomentose, granulate, and near the inner side are several longitudinal rows of beading. The upper surface is flattened, with a median ridge, the outer margin spinose; the inner margin of the palm has an upward-turned crest, and between this crest and the median ridge the surface is concave. Fingers short, thin, close-fitting, $1/3$ the length of the hand, tips crossed.

Ambulatory legs are short, compressed, rugose, spined and lightly margined with tomentum; merus wide, postero-distal lamellar process shields $1/2$ the length of the carpus on its posterior face; the carpus has a like projection over $1/3$ the propodal length; propodus fluted with ridges of spinules; dactyli falcate, corneous tipped. The telson is composed of 7 plates.

Color in alcohol.—Cream tipped with orange-red.

Measurements.—Male holotype: length of carapace 3.5 mm., width 3.1 mm., length of carpus 1.5 mm., width 1.1 mm., length of hand 2.2 mm., width 1.2 mm.

Range.—Known only from the type-locality. Gulf of California.

Material examined.—One male and one ovigerous female (see type).

Habitat.—Found among gorgonian corals, sponges and bryozoan growths, at extreme low tide.

Remarks.—The aberrant type, herein described, somewhat resembles, in the shape of the carapace, *Ethusa sexdentata* (Stimpson), as figured in Smithsonian Misc. Coll., vol. 49, no. 1717, 1907, pl. 19, fig. 4, with due allowance for family differences.

Pisonella, gen. nov.

Carapace suboval, orbicular, slightly convex laterally, lateral margins high, ridged. Front depressed, arched and subentire in dorsal view, with median alone or with median lateral projections when viewed from the front. Eyes very small.

First article of outer antennae produced, joining margin of carapace, as in the genus *Porcellana*; flagellum longer than carapace. Chelipeds short, stout; carpus with inner margin armed or unarmed; hands thick. Ambulatory legs stout; dactyli simple, not multiunguiculate.

This proposed genus has a close affinity to the genus *Pisosoma* Stimpson, 1858, which is based on *P. pisum* (M. Edw.), 1837, but differs in that the eyes are smaller and that the basal segment of the antennae is removed from the ocular hiatus, instead of the eyes being large, and the first article of the outer antennae short, not reaching upper margin of the carapace and occupying a portion of the ocular hiatus, as in the genera *Pisosoma* and *Petrolisthes* Stimpson, 1858. It differs, also, from the genus *Porcellana* Lamarck, restricted Stimpson, 1858, by the carapace not being generally longer than broad, the front not tridentate and prominent.

Genotype.—*Pisonella sinuimanus* (Lockington), (= *Pisosoma sinuimanus* Lockington).

Remarks.—This genus is proposed for the reception of the following species:

Pisonella sinuimanus (Lockington), (= *Petrolisthes* (*Pisosoma*) *sinuimanus* Lockington), the genotype.

Pisonella tuberculipes (Lockington), (= *Pachycheles tuberculipes* Lockington, = *Polyonyx tuberculipes* (Lockington) Nobili).

Pisonella smithi (Glassell), (= *Pisosoma smithi* Glassell).

Pisonella erosa (Glassell), (= *Pisosoma erosa* Glassell).

KEY TO THE SPECIES OF PISONELLA

- A¹. Telson of abdomen with 7 plates. Carapace without lateral spines.
- B¹. Carapace with light transverse plications or nearly smooth. Chelipeds smooth or lightly granulated on under surface.
- C¹. Carapace nearly smooth. Chelipeds granulate; carpus armed with an inner marginal lobe; hands unequal.....*sinuimanus*
- C². Carapace lightly rugose. Chelipeds granulate on hands; carpus unarmed, lightly rugose; hands subsimilar.....*smithi*
- B². Carapace heavily eroded. Chelipeds eroded on upper surface, rugose and roughened on under surface; carpus armed, eroded; hands unequal. Ambulatory legs eroded.....*erosa*
- A². Telson of abdomen with 5 plates. Carapace with lateral spines. Chelipeds heavily tuberculated on upper surface, smooth on under side; carpus armed; hands in male dissimilar.....*tuberculipes*

Pisonella sinuimanus (Lockington), new combination

Plate 34, figure 2

Petrolisthes (*Pisosoma*) *sinuimanus* Lockington, Ann. Mag. Nat. Hist., ser. 5, vol. 2, 1878, p. 401 (type-locality [?], La Paz and Port Escondido, Baja

California, Mexico; types not extant).

Petrolisthes sinuimanus (Lockington) Nobili, Boll. Mus. Zool. Anat. comp. R. Univ. Torino, vol. 16, no. 415, 1901, p. 15 (Isle of Flamenco, Ecuador).
—Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 599.

Pisosoma sinuimanus Lockington. Glassell, *Zoologica*: N. Y. Zoological Soc., vol. 22 (part 1), no. 4, 1937, p. 83.

This species was found at two localities on the Gulf coast of Baja California, Mexico; La Paz and Puerto Escondido, and was described by Lockington in 1878. In 1906 the type series was destroyed in the San Francisco disaster.

In 1931 and in subsequent years, I have collected this species throughout the Gulf of California, and have examined many other specimens collected in the same locality. From a small series collected at Puerto Escondido (Hidden Harbor), I am designating one male the neotype, and one female the allotype.

Neotype.—Male; Cat. No. 1132, San Diego Society of Natural History; from Puerto Escondido, Baja California, Mexico; December 19, 1931; collected by Steve A. Glassell.

Allotype.—Female; Cat. No. 1133, San Diego Society of Natural History; Puerto Escondido, Baja California, Mexico; December 19, 1931; collected by Steve A. Glassell.

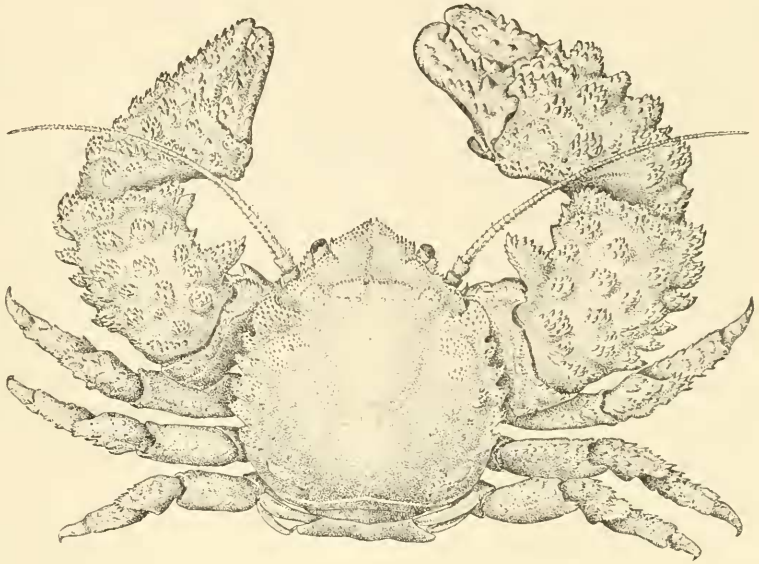
Diagnosis.—Carapace suboval, anteriorly depressed, lateral margins granular. Front with a median, triangular, depressed lobe in front view. Carpus unilobate, ridged.

Description.—Carapace suboval, convex fore and aft, depressed anteriorly, lightly punctate, regions lightly defined, lateral margins granular, lightly serrate; posterior margin a concave obtuse angle; front entire in dorsal view, arched, viewed from the front, with a median, triangular, depressed lobe.

Chelipeds unequal, similar; merus with a blunt, granulate, low, longitudinal lobe upon the inner distal margin; carpus more than half as wide as long, armed with a single, granulate, blunt tooth on proximal half of anterior margin, upper surface granulate, with three longitudinal, rolling ridges, divided by furrows, median ridge the most elevated; hands unequal, subsimilar, thick, with four longitudinal rolling ridges, divided by furrows, entire outer face granulate; outer margin thick, granulate, to upturned thick tip of pollex; inner margin sharply oblique, forming a flattened, triangular surface in a vertical plane whose base is proximal, from near proximal end to a low lobe behind the upper base of the dactylus, the line from the base of the hand to the base of the finger thus forming an obtuse angle; the dactyli are sinuous, stout, cylindrical, with blunt, curved, lobular tips; dactyl of major hand armed with two blunt teeth, the pollex with one.

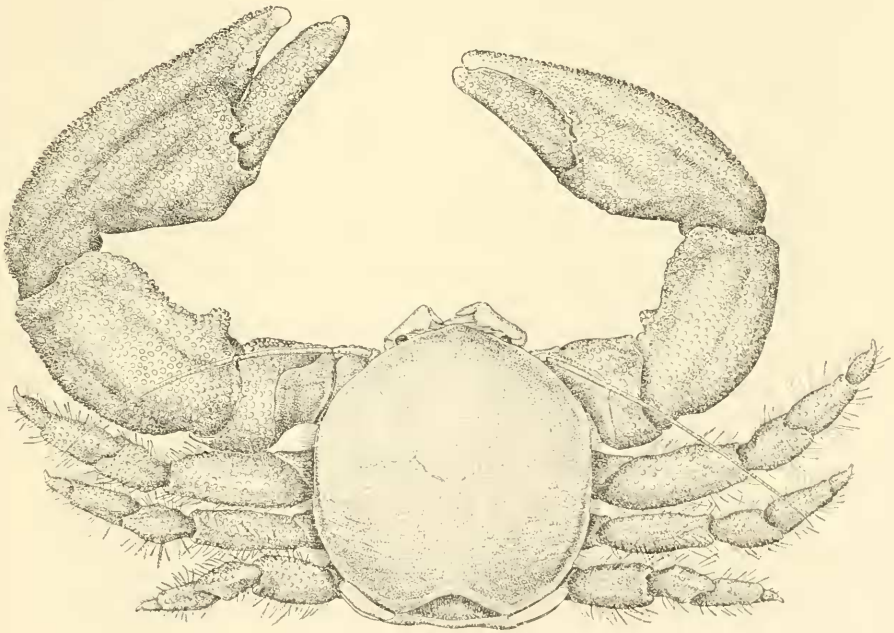
Ambulatory legs stout, granulate; carpus and propodus more granulate than merus; carpus of 1st and 2nd legs produced backward at posterior distal end; Dactyli stout, curved at corneous tip, setaceous, armed on under margin with a row of spines; propodus of 1st leg armed with spines on posterior margin. Epimera and abdomen fimbriate. Legs with a few setae.

Color in life.—The color varies from light cream to buff; the ventral side is slightly iridescent.



1

2 mm.



2

3 mm.

Fig. 1. *Pisonella tuberculipes* (Lockington). Male neotype.
Fig. 2. *Pisonella sinuimanus* (Lockington). Male neotype.

Measurements.—Male neotype: length of carapace 6 mm., width 6 mm. Female allotype: length of carapace 4.5 mm., width 5 mm.

Range.—From the Gulf of California to Ecuador (Nobili).

Material examined.—The types were selected from a series of 7 males and 2 females, collected by the author, at Puerto Escondido (Hidden Harbor), Baja, California, Mexico; December 19, 1931; at low tide under rocks.

A series of 20 males and 20 females, from the NE end of Tiburón Island, Gulf of California; January 2, 1932; collected by the author.

Habitat.—Found on the under side of rocks in the lower inter-tidal zone to a depth of 3 fathoms.

Remarks.—The sexes may be instantly determined by the shape of the terminal segments of the abdomen: in the male the ultimate plates are short and wide, while in the female they are subquadrate; the penultimate lateral plates in the male are long and narrow, the margins subparallel, while in the female these plates are subtriangular, widest distally. The telson is composed of seven plates.

Contrary to Lockington's description, in which he states that this is a variable species, I have found very little variation, except as to size and sex. A few specimens may show considerable roughness on the inner side of the hands, the carapace may be more punctate or lightly pubescent in others, but the carpus of the chelipeds is always armed with the proximal lobe on the anterior margin, even though distally the margin may be produced almost as far forward as the apex of the lobe. I have examined several hundred specimens of this species, all from the Gulf of California.

Pisonella tuberculipes (Lockington), new combination

Plate 34, figure 1

Pachycheles tuberculipes Lockington, Ann. Mag. Nat. Hist., ser. 5, vol. 2, 1878, p. 404 (type-locality, La Paz, Baja California, Mexico; type not extant).

Polyonyx tuberculipes (Lockington) Nobili, Boll. Mus. Zool. Anat. comp. R. Univ. Torino, vol. 16, no. 415, 1901, p. 21 (Bay of S. Elena, Ecuador). —Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 601.

Lockington described this species from 5 specimens (sex not noted, though undoubtedly females) taken at La Paz, and other ports on the Gulf of California. This type series was destroyed in the same manner and at the same time as the types of *P. sinuimanus*.

In 1935 I collected a large series of this species at Punta Peñasco, Sonora, Mexico. From this material I am designating one male, the neotype, and one female, the allotype.

Neotype.—Male; Cat. No. 1134, San Diego Society of Natural History; from Punta Peñasco, Sonora, Mexico; May 2, 1935; collected by Steve A. Glassell.

Allotype.—Female; Cat. No. 1135, San Diego Society of Natural History;

from Punta Peñasco, Sonora, Mexico; May 2, 1935; collected by Steve A. Glassell.

Diagnosis.—Carapace slightly convex; lateral margins dentate; regions defined, front projecting, subentire in dorsal view. Chelipeds in male, unequal, dissimilar, covered with granulate tubercles. Ambulatory legs tuberculate. Flagellum lightly ciliate. Telson with 5 plates.

Description.—Carapace slightly longer than wide, measured from tips of spines, convex, with scattered tufts of pubescence, regions defined, areolate. Lateral margins with 6 or 7 teeth, their upper surface covered with spinules, the anterior tooth a spine-tipped lobe, nearly twice the width of the base of the 2nd tooth; the posterior tooth is the extension of a short ridge on the carapace; inside of the lateral spines, on the carapace, are several small granulate tubercles. The protogastric ridge is sharply defined, tomentose, extending much higher than the horizontal frontal region, and separated from a small, serrate-margined, hepatic lobe, by a shallow sinus. The front projects forward, is broadly arched or subtriangular, with a median furrow; in a dorsal view the outer margin is subentire, and granulous; in a front view the median tooth is sharply depressed, triangular, acute; the lateral lobes are separated from the median by a high arched sinus, and are turned down and slightly under. The upper ocular margin has a median, granulate tubercle, as has the upper border over the basal article of the antennae. There is a sharp spine on the epistome below the basal antennal article. The flagellum of the antennae is lightly ciliate.

The chelipeds in the male are stout, unequal, dissimilar and covered on their upper surface with numerous granulous tubercles; the under surface is smooth; in the females the chelipeds are more nearly equal. Merus short on upper surface, broad, armed on inner margin with a short, lamellar, granular, distal lobe; carpus longer than broad, armed on inner margin with a proximal subhorizontal, granulous spine, nearly half as long as the inner carpal margin; from the distal base of this tooth to the distal end of the carpus, the margin is outwardly oblique and armed with several, short, stout spines. The upper surface of the carpus is covered with spinose tubercles, with upturned spines on the outer margin. The hands are thick, contorted, grotesque, unequal in the males, dissimilar, and are $1/3$ longer than their carpi. The fingers of the major hand, in the male, are widely gaping, strongly curved, blunt tipped; the dactyl is falcate, armed with a large median and proximal tooth; the pollex with a smaller distal tooth. The fingers of the minor hand, which resemble those of both hands in the female, gape in a lesser degree; the dactyl is armed with a row of well formed teeth, the proximal the largest. The outer margins of the palms are bordered with spines and setae. The carpus and hands, on their upper, outer surfaces, are pubescent.

The ambulatory legs are stout, roughened with rugae and granulous tubercles, and are covered with tomentum. The telson of the abdomen is composed of 5 plates.

Sexual variation.—In the female the hands are more nearly alike than in the male. As in *P. sinuimanus*, the ultimate plates in the male telson are short and wide, the penultimate lateral plates long and narrow, the margins subpar-

allel; in the female the ultimate plates are subquadrate, the laterals widest distally.

Color in life.—Muddy grey, with a dark patch on the central regions. In alcohol the carapace and chelipeds are light pink.

Measurements.—Male neotype: length of carapace 4.1 mm., width 3.9 mm., length of carpus of major cheliped 3 mm., of hand 4 mm. Female allotype (ovigerous): length 3.1 mm., width 3.1 mm.

Range.—From the Gulf of California, Mexico, to Ecuador (Nobili).

Material examined.—Several series of both sexes, numbering more than 25 specimens, collected by the author at San Felipe, Baja California, Mexico, June 5, 1933; and Punta Peñasco, Sonora, Mexico, May 2, 1935, and April 12, 1937.

Habitat.—This little crab is found on sponge incrustated sea-fans, but more frequently on the rough sponges themselves, at extreme low water. They are quite numerous, though obscure.

Remarks.—Lockington's description of this species is clear and unmistakable. That he placed it in the genus *Pachycheles*, was due, more to the importance placed on the conformation of the chelipeds than its anatomical structure, for while the chelipeds might very easily belong to *Pachycheles*, the epimera is entire, a peculiarity that removes it from that genus.

Nobili placed this species in the genus *Polyonyx*, with reservations, as he was satisfied that it did not meet with all the requirements of that genus. He was influenced by noting a small spinule on the dactyli of the ambulatory legs.

To obviate any chance of hidden characters remaining obscured by tomentum, I depilated the largest male in my series (the neotype), by using a weak solution of sodium hypochlorite. When thus cleaned, the dactyli show only the usual small spines on the under margin, which are to be found on nearly all the uninguiculate dactyli in this family.

Pisonella smithi (Glassell), new combination

Pisosoma smithi Glassell, Trans. San Diego Soc. Nat. Hist., vol. 8, no. 21, 1936, p. 286 (type-locality, Miramar Beach, near Guaymas, Sonora, Mexico).

Pisonella erosa (Glassell), new combination

Pisosoma erosa Glassell, Trans. San Diego Soc. Nat. Hist., vol. 8, no. 21, 1936, p. 289 (type-locality, Magdalena Bay, Baja California, Mexico).

Types of the above two species are located in the U. S. National Museum, and with the San Diego Society of Natural History.

KEY TO THE WEST NORTH AMERICAN SPECIES OF PETROLISTHES

- A¹. Hands bordered with setae, margined with spines. Chelipeds with carpus armed. Ambulatory legs pubescent or setose; upper margin of meri armed.

- B¹. Front trilobate. Chelipeds pubescent; hands dissimilar; fingers with pubescence in gape.
- C¹. Carapace pubescent, with distinct striations. Carpus twice as long as wide. Meri of ambulatory legs with postero-distal end spined. Abdomen pubescent.....*hirtipes*
- C². Carapace naked without distinct striations. Carpus less than twice as long as wide, armed with 3 or more spines. Meri of ambulatory legs at postero-distal end unspined. Abdomen naked.*nigrunguiculatus*
- B². Front triangular. Carapace with distinct striations. Under side of hands roughened; fingers with a short pile of pubescence; carpus with 3 or more spines. Ambulatory legs setose.
- C¹. Carapace pubescent. Chelipeds pubescent; hands similar, carpus with 6 spines, twice as long as wide. Meri of ambulatory legs at postero-distal end spined. Abdomen pubescent.*sanfelipensis*
- C². Carapace naked. Chelipeds naked; hands dissimilar; carpus with 4 or 5 spines, less than twice as long as wide. Meri of ambulatory legs at postero-distal end unspined. Abdomen naked.*polymitus*
- A². Hands unmarginated with setae.
- B¹. Hands unmarginated with spines, similar.
- C¹. Fingers pubescent in gape. Meri of ambulatory legs at postero-distal end unspined, upper margin unarmed. Chelipeds naked; under side of hands smooth. Carapace naked.
- D¹. Carapace smooth. Carpus unarmed; margins parallel.
- E¹. Front triangular. Carpus twice as long as wide. Ambulatory legs pubescent.....*eriomerus*
- E². Front trilobate. Carpus more than twice as long as wide. Meri of ambulatories naked.....*gracilis*
- D². Carapace roughened, regions well marked. Front triangular. Carpus less than twice as long as wide, armed with a lamellar lobe.....*cinctipes*
- C². Meri of ambulatory legs armed on upper margin. Chelipeds with under side of hand roughened.
- D¹. Fingers pubescent in gape. Meri of ambulatory legs at postero-distal end unspined. Carapace pubescent, areolate, with distinct striations. Chelipeds pubescent, with carpi unarmed.*rathbunae*
- D². Movable finger with a short pile of pubescence only. Meri of ambulatory legs at postero-distal end spined. Carapace heavily striate. Chelipeds naked; carpi armed with 3 or more spines.*edwardsii*
- B². Hands unmarginated with spines, under side smooth, dissimilar; fingers with a short pile of pubescence; carpus less than twice as long as wide. Carapace pubescent. Ambulatory legs pubescent; meri unarmed on upper margin, at postero-distal end unspined.

- C¹. Carapace with regions well marked; frontal trilobate. Chelipeds pubescent; carpus armed.....*crenulatus*
- C². Carapace with regions indistinct; front triangular. Chelipeds naked; carpus unarmed.....*schmitti*
- B³. Hands margined with spines, under side roughened, similar; fingers with a short pile of pubescence. Chelipeds pubescent; carpus twice as long as wide, armed with 5 or 6 spines. Carapace pubescent, surface smooth; front triangular. Ambulatory legs setose; meri armed, postero-distal end spined.....*hirtispinosus*
- A³. Hands unmargined with setae, margined or unmargined with spines, under side smooth. Chelipeds naked or pubescent. Meri of ambulatory legs armed.
- B¹. Carapace naked or pubescent, surface smooth. Front triangular. Chelipeds naked or pubescent; carpus twice as long as wide, armed with 3 spines; hands dissimilar, unmargined with spines; fingers with a short pile of pubescence. Meri of ambulatory legs at postero-distal end spined. Not dimorphic...*armatus*
- B². Carapace naked, areolate, regions well marked. Front trilobate. Chelipeds naked; carpus in female armed, 3 times as long as wide in male. Hands similar, margined with spines in female; fingers pubescent in gape. Meri of ambulatory legs at postero-distal end unspined. Dimorphic.....*tiburoniensis*

KEY TO THE WEST NORTH AMERICAN SPECIES OF PACHYCHELES

- A¹. Telson of abdomen with 5 plates.
- B¹. Front prominent, subtriangular.
- C¹. Gape of fingers naked.
- D¹. Chela with setae only. Carpus with a single serrated lobe. Carapace pubescent.*rudis*
- D². Chela with pubescence only. Carpus with 5 teeth. Carapace lightly setose.....*marcortezensis*
- C². Gape of fingers with setae and pubescence. Chela with pubescence only. Carpus with 2 or 3 teeth. Carapace naked except rostrum.*holosericus*
- B². Front not prominent, subarcuate. Gape of fingers naked. Chela naked. Carpus unarmed. Carapace naked.....*biocellatus*
- A². Telson of abdomen with 7 plates. Carpus with 3 teeth.
- B¹. Front prominent, subtriangular. Gape of fingers pubescent. Chela with pubescence and setae. Carapace naked except rostrum.*pubescens*
- B². Front not prominent, subarcuate.
- C¹. Gape of fingers with setae. Chela with setae only. Carapace lightly setose.*sonorensis*
- C². Gape of fingers naked. Chela with pubescence only. Carapace naked except rostrum.....*setimanus*

GONEPLACIDAE

Hexapus williamsi, sp. nov.

Plate 35, figures 1-4

Type.—Male, holotype; Cat. No. 1158, San Diego Society of Natural History; from San José, Guatemala, 10-13 fathoms; April 1, 1937; collected by Woodbridge Williams on Captain Fred E. Lewis' yacht "Stranger."

Diagnosis.—Carapace punctate, regions lightly defined. Front $1/4$ the width of carapace, trilobed, the median not as advanced as the laterals. Chelipeds unequal; hands with a tubercle on inner, upper distal side of palm to engage with oblique stridulating ridge extending from the lateral margins of the buccal area. Sixth segment of male abdomen $1/2$ longer than wide at distal end, 2-3-4-5-6 segments coalesced.

Description.—Carapace nearly $1/3$ wider than long, convex fore and aft, transversely flattened, punctate, lateral margins granulated; cervical groove defines the lateral regions; gastric and cardiac regions smoother than remaining surfaces, separated by a light sulcus; a light fold over the intestinal region. The postero-lateral is short, subequal in length to the width of the ocular hiatus, with two concave margins meeting at the proximal $1/3$ in forming a sharp projection. The posterior margin is slightly convex, $1/6$ wider than the length of the carapace. The upper ocular margin is raised and granulose. The front is depressed, wider at the tip than between the eyes; in a front view the lateral ends project farther than the broadly triangular median lobe; the margin between the median and the laterals is granulose and concave. The eye-stalks are heavy at the base, constricted in the middle, the cornea small in proportion to the base. A narrow, oblique row of stridulations on the epistome meets the buccal cavity opposite the distal end of the merus of the 3rd maxillipeds. The abdomen of the male is slender; only the 1st and 7th segments are articulated; the five interior segments are coalesced; the penultimate segment is nearly as wide as long at distal end; the ultimate segment is as high as wide, subovate.

Chelipeds dissimilar, unequal, tomentose; the minor hand is held in a normal position, the major hand is carried perpendicular to the minor; major hand inflated, the palm nearly as wide as long, upper margin thick and, like the minor hand, with a tubercle on the inner distal face which engages with the stridulations of the epimera. The outer surface of the hands is granulose under a thick pile of tomentum. The lower margin of the major hand is sinuous, of the minor straight and beaded. The pollex in both hands is straight and the inner edge armed with 3 or 4 large blunt teeth. The dactyli are compressed, thin, fluted and armed with 3 large teeth on the major, 2 on the minor; while the dactyli slightly cross their pollices at the tip, they do not completely close from gape to apices.

The ambulatory legs are densely margined with tomentum, punctate, the 2nd the longest. Of the 1st leg the merus is trihedral, twisted, with a row of well spaced tubercles on the posterior outer margin; of the 2nd and 3rd (last) legs the merus is compressed, 3 times as long as broad, narrowing distally, and subequal in length to the carpus and propodus combined; the dactyli are as long or

longer than their propodi, in the 1st pair slightly twisted, in the 2nd and 3rd straight, long, tapering, fluted, with the crests tomentose.

Color in alcohol.—Cream underlaid with light pink on the branchial and cardiac regions. Tomentum earthy brown.

Measurements.—Male, holotype: length of carapace 5.8 mm., width 8.6 mm., of posterior margin 6.8 mm., of front 2 mm., length of major hand 4.8 mm., width 2.5 mm., length of 2nd ambulatory leg 10.8 mm., of 6th abdominal segment 2 mm., width of base 1.7 mm., width distally 1 mm., height of 7th segment 1 mm.

Range.—Known only from the type-locality (see type).

Material examined.—Only the holotype (see type).

Habitat.—Taken on a fine black sand and mud bottom in from 10 to 13 fathoms, the sand mixed with clinkers and volcanic rock.

Remarks.—This proposed species is closely allied to *H. sexpes* (Fabricius), 1798, but differs from that species: (1) by the regions of the carapace being outlined by shallow sulci, instead of being usually not perceptible, (2) by the front being partly deflexed, the lateral lobes advanced further outward and downward than the median, the width about $\frac{1}{4}$ the width of the carapace, instead of being vertically deflexed, truncate, and about $\frac{1}{5}$ or $\frac{1}{6}$ the width of the carapace, (3) by the dactyl of the major hand being armed with 3 large teeth, instead of with 2 truncate teeth near the base of the inner margin, (4) by the merus of the 3rd (last) leg being 3 times as long as broad, instead of twice as long as broad, (5) by the propodus of the 3rd leg being about $1\frac{1}{2}$ times as long as broad, instead of semi-circular, (6) by the dactyli being as long as the propodi, sharp-pointed, fluted, straight, tapered, instead of short and thick.

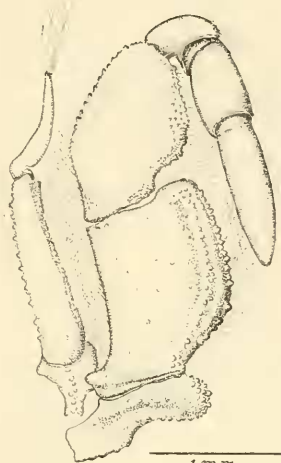
This species is named for Mr. Woodbridge Williams, student, of Pomona College, Claremont, California, who made a splendid collection of crustacea along the coasts of South and Central America, while on Captain Fred E. Lewis' yacht "Stranger," during the Spring of 1937. I am indebted to him for bringing to my attention this and many other obscure forms, which link the eastern Pacific fauna with those of the western Atlantic and Indo-Pacific regions.

PINNOTHERIDAE

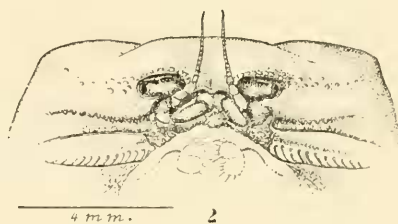
Subfamily Pinnotherlinae

Alarcónia, gen. nov.

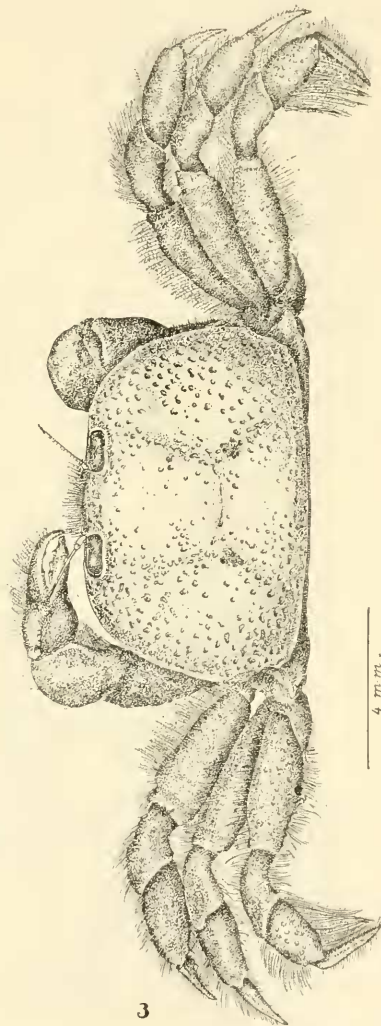
Carapace much wider than long; integument firm, regions strongly marked; front narrow, nearly transverse, with a median groove. Orbit broadly ovate or triangular, with a wide inner hiatus, which is partly occupied by the basal antennal joint. Antennules transversely or obliquely plicated in wide fossettes which communicate with each other beneath the front. Eye-stalks very short. Epistome linear-transverse. Ischium of maxillipeds shorter or but slightly less in length than merus; merus with distal margin slightly concave; palp jointed to



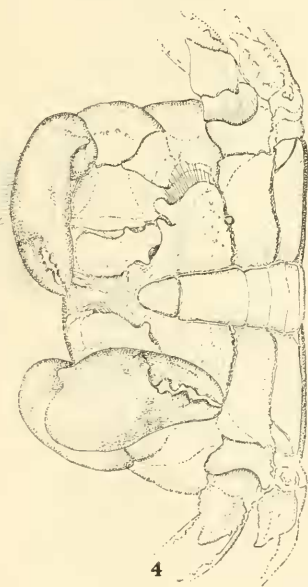
1



2



3



4

- Fig. 1. *Hexapus williamsi* Glassell, sp. nov. Outer maxilliped.
 Fig. 2. *Hexapus williamsi* Glassell, sp. nov. Buccal area.
 Fig. 3. *Hexapus williamsi* Glassell, sp. nov. Dorsal view.
 Fig. 4. *Hexapus williamsi* Glassell, sp. nov. Ventral view.

summit of merus; third joint articulated on inner side of the preceding one near base.

Chelipeds of moderate size; merus trigonous; hand large, compressed. Second ambulatory leg larger than the first; third largest of all; fourth the smallest; propodus of first leg subcircular, compressed. Abdomen in both sexes usually 7-jointed and narrower at base than width of last sternal segment. In the male, the abdominal appendages protrude from the sternal trench opposite the lateral margins of the ultimate segment, bending upward and forward in a semicircle toward the buccal opening.

This proposed genus is allied to the genus *Pinnixa* White, 1846, by the general shape of the carapace and the relative sizes and shapes of the ambulatory legs, but differs from that genus in that the ischium and merus of the outer maxillipeds are not fused or coalesced, but articulated, and by the ischium being much longer in proportion. This proposed genus is also allied to the genera *Tritodynamia* Ortman, 1894, and *Asthenognathus* Stimpson, 1858, of the subfamily Asthenognathinae. It resembles the former in that the outer maxillipeds are somewhat similar, but it differs in that the eyes are not large, the carapace not smooth, and the 2nd ambulatory leg is not the largest. It resembles the latter in that the ambulatory legs, as shown by Stimpson's figure, are quite similar, but it differs in the disposition of the segments of the palp. In addition to the above, there is also a relationship to the genus *Lambdophallus* Alcock, 1900, of the subfamily Hexapodinae, as in both genera the abdominal appendages of the male are not distally confined under the abdomen.

Genotype.—*Alarcónia seaholmi*, new species, taken at Acapulco, State of Guerrero, Mexico, 6 to 10 fathoms; April 6, 1937; collected by W. J. Seaholm.

Remarks.—This proposed genus is named for Hernando de Alarcón, navigator, who, under the direction of the viceroy of New Spain, was sent to support by sea the expedition of Francisco Vasquez de Coronado, to the Seven Cities of Cibola. During this adventure he discovered and explored the mouth of the Colorado River, in the year 1540.

Alarcónia seaholmi, sp. nov.

Plate 36, figures 1-5

Type.—Male, holotype, Cat. No. 1159, San Diego Society of Natural History; from Acapulco, State of Guerrero, Mexico, 6-10 fathoms; April 6, 1937; collected by Captain W. J. Seaholm, on Captain Fred E. Lewis' yacht "Stranger."

Diagnosis.—Carapace broadly ovate, regions well marked, branchial regions tuberculate and granulose, a transverse cardiac ridge, opposite the ends of which, on the branchial region, is a large tubercle. The 4th ambulatory leg extends past the merus of the 3rd by the length of the dactyl. The ischium and merus of the outer maxillipeds are long and narrow, the merus the longest.

Description.—Carapace nearly $\frac{2}{3}$ as long as wide, convex, broadly ovate; regions well defined with sulci; branchials granulated and tuberculated, tubercles more prominent opposite the cardiac region; cardiac region with a transverse,

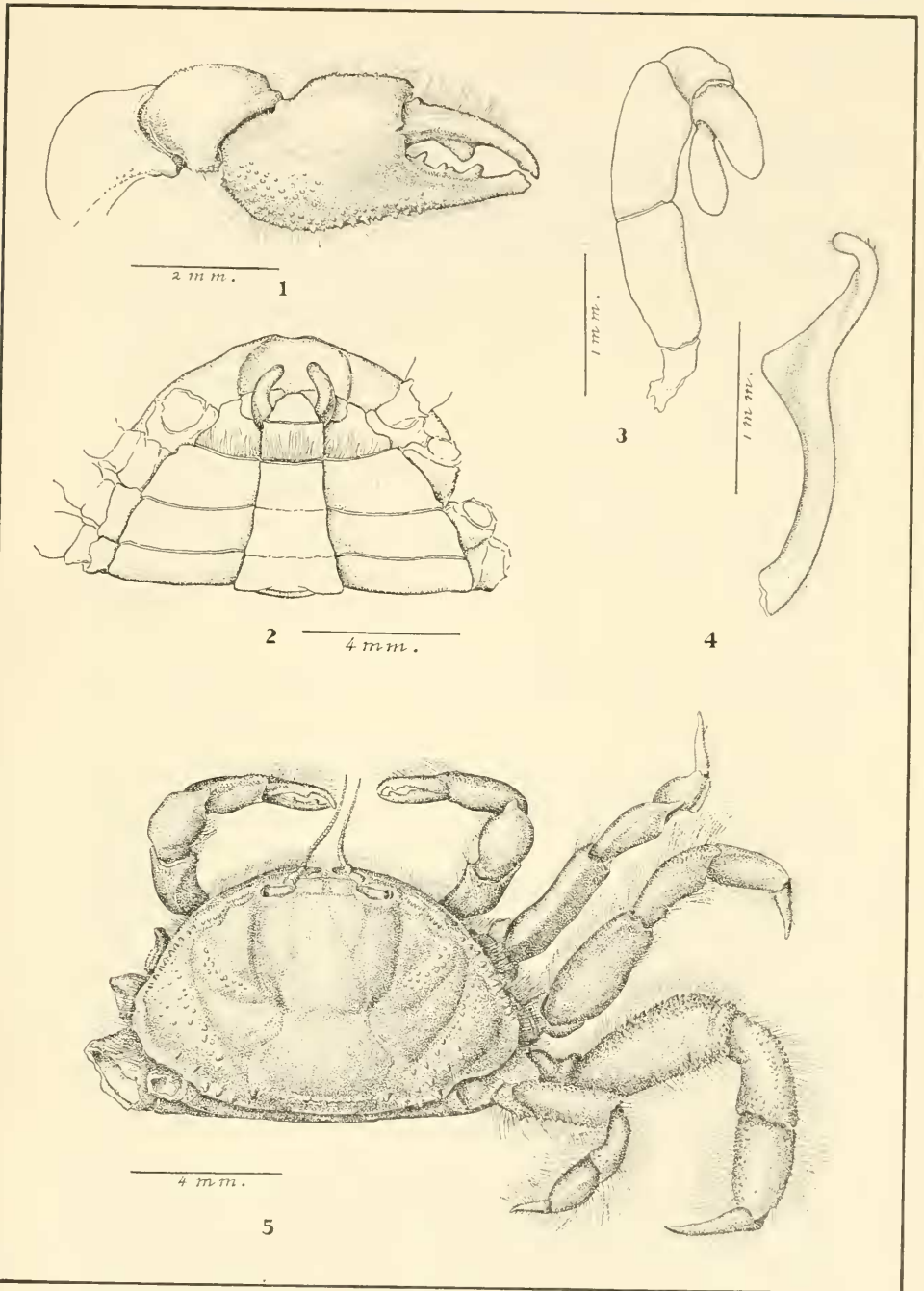


Fig. 1. *Alarcónia seaholmi* Glassell, sp. nov. Right chela.
 Fig. 2. *Alarcónia seaholmi* Glassell, sp. nov. Ventral surface.
 Fig. 3. *Alarcónia seaholmi* Glassell, sp. nov. Outer maxilliped.
 Fig. 4. *Alarcónia seaholmi* Glassell, sp. nov. Male abdominal appendage.
 Fig. 5. *Alarcónia seaholmi* Glassell, sp. nov. Dorsal view.

granulated ridge, posterior to the ridge the surface falls sharply to the posterior margin; on the branchial regions at each end of this ridge is a large tubercle. The antero-lateral margin is spinulose toward the lateral angle, granular anteriorly; the postero-lateral margin is sinuous, nearly $1/4$ the width of the carapace; at the proximal end is an upright tubercle, the last of 3 tubercles which decorate the distal ends of the convex posterior margin. Front truncate, entire, slightly produced, with the outer angles rounded, and with a median groove on the upper surface; in width it is $1/7$ the width of the carapace. The eye-stalks are stout at their bases, tapering sharply to the minute cornea, and with a submedian constriction; the width of the base is slightly less than the length. The length of the antennae is nearly twice the width of the front. Buccal cavity with parallel sides. Maxillipeds standing wide apart, the merus and ischium longer than broad, the merus longer than the ischium.

Chelipeds similar, equal, lightly margined with fine setae; merus trigonate, the outer lower margin armed with small tubercles; carpus subrhomboidal viewed from above, the distal, triangular end covering the upper articulation of the hand; the lower articulation of the hand is considerably posterior to that of the upper, and on the inner side of the palm; the manus from the lower proximal end to the tip of the pollex is more than twice as long as wide; the upper crested margin of the palm is a little more than half as long as the thin, granulated lower margin. The hand is compressed; pollex horizontal, thin, with a bifid tip, armed on the inner margin with 3 well-spaced teeth, the median bifid, the fingers gape from base to apices; the dactyl is armed with a large, median, subtriangular tooth.

Of the ambulatory legs the 3rd pair is the largest and longest, followed by the 2nd, 1st and 4th, all are lightly margined with setae. The 1st and 2nd pair have their carpal joints crested, more prominently on the 1st pair; the propodus of the 1st leg is compressed, subcircular, with a double, flattened, upper crest; the dactyl is horizontally compressed, lanceolate, twisted and bent upward, about as long as the propodus; the dactyl of the 2nd leg is compressed, straight, and longer than the upper margin of the propodus; the merus of the 3rd leg is $1/2$ as wide as long, with a granulated upper margin and a granulated and spinous lower margin; the ischium has a strong median spine on its posterior margin; carpus nearly $1/3$ longer than the propodus; dactyl is slightly shorter than the propodus, tapered, straight; of the 4th leg, whose upturned dactyl reaches past the distal end of the merus of the 3rd leg, the lower margin of the ischium is granulated, with a single subdistal tubercle; merus 3 times as long as wide, margins parallel, the lower granulated; the propodus is as wide as the merus and subequal in length to the dactyl.

The abdomen of the male is widest at the junction of the 2nd and 3rd segments, the 4th and 5th segments are coalesced, the margins of the 5th and 6th segments are parallel, there is a line of light tomentum at the articulation which extends across the sternum at this point, the base of the 7th segment is less in width than that of the truncate distal end of the 6th, its height is $1/2$ its base and is semioval. The abdominal appendages of the male protrude from a subcircular groove opposite the lateral margins of the terminal abdominal segment,

and curve upward and forward toward the buccal area. At their apices they incline toward each other.

Color in alcohol.—Light cream. Setae and tomentum red-brown.

Measurements.—Male holotype: length of carapace 5.8 mm., width 9 mm., of posterior margin 6.5 mm., width of outer orbital margins 3 mm., of front 1.3 mm., length of 1st leg 7.7 mm., of 2nd leg 9.4 mm., of 3rd leg 11.7 mm., of 4th leg 6.8 mm., of hand 4.5 mm.

Range.—Known only from type-locality (see type).

Material examined.—A single male specimen lacking the ambulatory legs on the left side.

Habitat.—Dredged on a sand and shell bottom in 6-10 fathoms. Commensal host, if any, unknown.

Remarks.—The references in the generic description to the female abdomen do not refer to this proposed species, but to a different species found on this coast, which will be described at a later date.

This proposed species is named for Captain W. J. Seaholm, who collected this and many other specimens while dredging for shells, for his sustained interest in the fields of natural science.

Pinnotheres orcutti Rathbun

Pinnotheres orcutti Rathbun, Bull. U. S. Nat. Mus., no. 97, 1918, p. 98, pl. 22, figs. 5-6, text fig. 50 (type-locality, Manzanillo, Mexico).

During the year 1936, Dr. Waldo L. Schmitt, of the U. S. National Museum, sent me for identification, among other material, a small series of *Pinnotheres* from the Tres Marias Islands, Mexico, collected by H. N. Lowe in March, 1930. These specimens I recognize as being *Pinnotheres orcutti* Rathbun, heretofore known only from the type specimen, a male. The following is a description of the female:

Diagnosis.—Carapace calcareous, suboctagonal, high, antero-lateral margins ridged. Front in dorsal view horizontal, bilobed, projecting. Dactyli of 4th pair of legs nearly $1/3$ longer than the others, and longer than their propodi.

Description.—Carapace calcareous, high, convex, suboctagonal, slightly longer than broad, broadest in posterior half, uneven, branchial regions with irregular lobes; dorsal surface pubescent and bordered by a raised rim; cardiac region surrounded by a furrow except anteriorly, no median tubercle near its posterior end, as in a smaller male. Front with two advanced, blunt-pointed lobes, separated by a wide U-shaped notch, behind which runs a broad median furrow. Lateral margin long, angled, convex; postero-lateral margin short, splayed out over propodite of 3rd leg; posterior margin convex. Basal segment of antennae elongate and obliquely placed.

Merus of outer maxilliped wide and angled; the propodus differs from that of the male by being obtuse at its apex, instead of subtriangular, and by having the dactyl extending nearly to the extremity of the propodus, instead of only part way, as in the male.

Chelipeds similar, stout, manus short, increasing greatly in width toward distal end, where it is slightly less in height than superior length; lower margin

concave under gape; pollex sharply turned up at apex, armed with a blunt proximal lobe and a row of small teeth, the distal the larger, while the median tooth is the largest; dactylus wide at base, strongly arched and armed with a wide, angular tooth in front of a deep proximal notch for the reception of the proximal lobe of the pollex; the tips of the fingers are sharp-pointed and cross each other.

The ambulatory legs are narrow; the 2nd leg the longest; the dactyli of the first three pairs are subequal in length, slightly pubescent and with spine-like tips; the dactyli of the 4th pair are nearly $\frac{1}{3}$ longer than the others, nearly straight, longer than their propodi, and with a fringe of pubescence on their lower margins.

The abdomen is circular; its terminal segment within the perimeter, its posterior margins oblique, its tip with a slight median emargination.

Color in alcohol.—Buff. Pubescence earthy brown.

Measurements.—Length of carapace: 8.5 mm., width 8.1 mm. Length of dactyli of ambulatory legs: 1st 1.6 mm., 2nd 1.7 mm., 3rd 1.4 mm., 4th 2.4 mm.

Range.—West coast of Mexico.

Material examined.—Two females, ovigerous, and one male; from Maria Madre Island, Tres Marias Islands, Mexico; March 1930; collected by H. N. Lowe. Collection of the U. S. National Museum.

One female, ovigerous, from Tenacatita Bay, Mexico; April 11, 1937; 5 fathoms; collected by Woodbridge Williams, on Captain Fred E. Lewis' yacht "Stranger."

Habitat.—Unknown. The Tenacatita Bay specimen had a calcareous worm tube attached to the carapace.

Remarks.—The use of the outer maxilliped as an infallible method of determination would have been rather difficult in the Tenacatita Bay specimen, had that one been the only specimen examined, for its outer maxillipeds were different from each other, in that the dactyli of the right and left sides were of different lengths, that of the right extending considerably past its propodus, while that of the left was short of its propodal apex. In addition, there is a marked variation in the shape of the propodus of the outer maxillipeds in the sexes, that of the males being subtriangular, with its dactyl short, while in the female the propodus is obtuse, the dactyl reaching to a point near its tip. The shape of the merus in the maxillipeds of both sexes is identical.

The only difference between the Maria Madre Island male and Rathbun's smaller type specimen is that the specimen I examined did not have the shallow right-angled indentations on either side of the 6th abdominal segment.

The eggs are abundant, globular, and slightly less than $\frac{1}{3}$ mm. in diameter.

Fabia granti Glassell

Plate 33, figure 2

Fabia granti Glassell, Trans. San Diego Soc. Nat. Hist., vol. 7, no. 28, 1933, p. 342, pl. 26 (type-locality, Magdalena Bay, Baja California, Mexico).

While collecting at San Felipe, a small fishing village near the head of the Gulf of California, in Baja California, Mexico, I took a large series of this

species which were found in a tide pool, commensal with *Crucibulum spinosum* (Sowerby). A series of more than 75 females and 15 males was collected at this locality on May 9, 1937. A description of the heretofore unknown male follows:

Description.—Carapace calcareous oviform or urnal, surface flat, depressed, with widely separated short hairs; anterior margins raised with pubescence; regions not defined; antero-lateral margins strongly converging posteriorly; posterior margin straight, deflexed, entire, as wide as the outer ocular width. Front broadly arched, entire, with upper median surface depressed and pubescent. The cervical groove is shallow, leading back from the upper margins of orbits. Eyes small, pigmented. Antennae minute, though long and slender.

Chelipeds similar, stout, short; merus crested with short pubescence; carpus depressed on upper surface, lightly pubescent on margins; hands short and wide, proximally inflated on inner side of palm; palm as wide as long, with an upper, broadly arched, pubescent carina; lower margin horizontal, an indistinct or obsolete, longitudinal, median ridge on outer surface. Pollex short, horizontal, except for sharply upturned, spine-like tip, armed on inner edge with an oblique, granulose cutting edge. Dactyl strongly curved at tip, and armed on the inner edge with a single submedian tooth. The fingers are close fitting, their tips crossing.

Ambulatory legs compressed, with spatulate propodi; the dactyli compressed, slightly curved, with needle-like, corneous tips. The 2nd and 3rd legs with plumose natatory hairs on the carpus and propodus. The meri are margined with a close pile of pubescence.

The sides of the abdomen converge from the 1st and 2nd to the 7th segment, the latter being semioval; the 1st and 2nd segments are nearly as wide as the sternum at this point.

Color in alcohol.—Buff. Pubescence dirty yellow.

Measurements.—Of largest male: length of carapace 3.7 mm., width 3.5 mm., width of posterior margin 1.6 mm., of front between the inner ocular margins 1.2 mm., length of hand 1.8 mm., height of palm 1.3 mm. Of smallest breeding specimen: length of carapace 2.3 mm., width 2.1 mm.

Range.—Throughout the Gulf of California, Mexico.

Habitat.—Found commensal in *Crucibulum*, *Acmaea* and *Crepidula*. The type specimen having been taken in a worm tube does not truly indicate its host, but rather that the holotype was disturbed in the dredge material.

Remarks.—This miniature male is undoubtedly a free swimmer, as the natatory hairs on the ambulatory legs would indicate. That it spends its time, other than in the breeding season, in a free state may be questioned, as a number of the males taken in this series were alone with their host. They may be nocturnal.

The genus *Fabia*, which is apparently restricted to American waters, has six recognized species at the present time, and of these species little is known of the males, a circumstance due to their size. Wells, 1928, described the male of *Fabia subquadrata* Dana, 1851, which, to judge from the text and figures, remarkably resembles *Pinnotheres concharum* (Rathbun), 1893, a species that I have frequently found in *Volsella capax* (Conrad), along with the female of *Fabia lowei* Rathbun.

